DRINKING WATER SURVEILLANCE PROGRAM

THUNDER BAY (BARE POINT) WATER TREATMENT PLANT

ANNUAL REPORT 1990

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EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

THUNDER BAY (BARE POINT) WATER TREATMENT PLANT
1990 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. In 1990, 76 supplies were being monitored.

The Thunder Bay (Bare Point) water treatment plant is a direct filtration plant which treats water from Lake Superior. The process consists of coagulation, flocculation, filtration and disinfection. This plant has a design capacity of 91.00 x 1000 m^3/day. The Thunder Bay (Bare Point) water treatment plant serves a population of approximately 64,500 in the north district of Thunder Bay.

Water at the plant and at two locations in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), and organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons, specific pesticides and volatiles). Samples were analyzed for specific pesticides and chlorophenols twice a year in the spring and fall.

Table A is a summary of all results by group.

No known health related guidelines were exceeded.

The Thunder Bay (Bare Point) water treatment plant, for the sample year 1990, produced good quality water and this was maintained in the distribution system.

TABLE A

DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP)

SUMMARY TABLE BY SCAN

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

SCAN	SITE RAW TESTS	POSITIVE	%POSITIVE	TREATED TESTS	POSITIVE	%POSITIVE	SITE 1 TESTS	POSITIVE	%POSITIVE	SITE 2 TESTS	POSITIVE	%POSITIVE	SITE 3 TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	8	1	12	12	0	0	9	1	11	3	1	33	9	1	11
CHEMISTRY (FLD)	33	33	100	66	66	100	15	15	100	.	.	.	38	38	100
CHEMISTRY (LAB)	231	160	69	231	142	61	198	151	76	91	64	70	252	180	71
METALS	264	54	20	264	50	18	253	75	29	138	39	28	322	94	29
CHLORGAROMATICS	154	0	0	140	0	0	84	0	0	42	0	0	98	0	0
CHLOROPHENOLS	6	0	0	6	0	0	.	.	.	.	.	.	.	.	.
PAH	185	0	0	168	0	0	17	0	0	.	.	.	17	0	0
PESTICIDES & PCB	375	0	0	354	0	0	128	0	0	65	0	0	149	1	0
PHENOLICS	11	1	9	11	0	0	.	.	.	.	.	.	.	.	.
SPECIFIC PESTICIDES	56	0	0	55	0	0	6	0	0	3	0	0	7	0	0
VOLATILES	290	1	0	319	33	10	116	12	10	87	9	10	203	22	10
TOTAL	1613	250		1626	291		826	254		429	113		1095	336	

DRINKING WATER SURVEILLANCE PROGRAM

THUNDER BAY (BARE POINT) WATER TREATMENT PLANT
1990 ANNUAL REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. In 1990, 76 systems were being monitored.

Appendix A has a full description of the DWSP.

The DWSP was initiated for the Thunder Bay (Bare Point) water treatment plant in May of 1988. Previous annual reports have been published for 1988 and 1989.

PLANT DESCRIPTION

The Thunder Bay (Bare Point) water treatment plant is a direct filtration plant which treats water from Lake Superior. The process consists of coagulation, flocculation, filtration and disinfection. This plant has a design capacity of 91.00 x 1000 m^3/day. The Thunder Bay (Bare Point) water treatment plant serves a population of approximately 64,500.

The sample day flows ranged from 30.4 x 1000 m^3/day to 41.12 x 1000 m^3/day.

General plant information is presented in Table 1 and a schematic of plant processes, chemical addition points and sampling locations in Figure 1.

SAMPLING AND ANALYSES

Sample lines at the wells were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

At all distribution system locations two types of samples were obtained, a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples were used to make an assessment of the change in the levels of inorganic compounds and metals, due to leaching from, or deposition on, the plumbing system. The only analyses carried out on the standing

samples therefore, were General Chemistry and Metals. The free flow sample represented fresh water from the distribution main, since the sample tap was flushed for five minutes prior to sampling.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. Retention time was calculated by dividing the volume of water between two sampling points by sample day flow. For example, if it was determined that retention time within the plant was five hours, then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

Stringent DWSP sampling protocols were followed to ensure that all samples were taken in a uniform manner (see Appendix B).

Plant operating personnel routinely analyze parameters for process control (Table 2).

Water at the plant and at two locations in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), and organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons, specific pesticides and volatiles). Samples were analyzed for specific pesticides and chlorophenols twice a year in the spring and fall. Laboratory analyses were conducted at the Ministry of the Environment facilities in Rexdale, Ontario.

RESULTS

Field measurements were recorded on the day of sampling and were entered onto the DWSP database as submitted by plant personnel.

Table 3 contains information on delay time between raw and treated water sampling, flow rate, and treatment chemical dosages.

Table 4 is a summary break-down of the number of water samples analyzed by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 lists all parameters analyzed in the DWSP.

Associated guidelines and detection limits are also supplied on Tables 5 and 6. Parameters are listed alphabetically within each scan.

DISCUSSION

GENERAL

Water quality was judged by comparison with the Ontario Drinking Water Objectives publication (ODWOs). When an Ontario Drinking Water Objective (ODWO) was not available, guidelines/limits from other agencies were used. These guidelines were obtained from the Parameter Listing System database.

IN THIS REPORT, DISCUSSION IS LIMITED TO:

- **RESULTS FROM RAW AND DISTRIBUTED WATERS;**
- **THOSE PARAMETERS WITH CONCENTRATIONS ABOVE GUIDELINE VALUES;**
- **POSITIVE ORGANIC PARAMETERS DETECTED; AS WELL AS**
- **PERSISTENT TRACES OF ORGANIC PARAMETERS IN THE RAW WATER.**

In this report comments are combined for all sample locations for each parameter discussed. Water in the distribution system can be a mixture from many sources. Due to the many wells supplying this water system and relatively few sample locations on DWSP, this report does not provide a complete picture of the drinking water quality.

BACTERIOLOGICAL

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality. Routine monitoring programs usually require that multiple samples be collected in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples.

Standard plate count was the only bacteriological analysis conducted on the treated and distributed water. No results were reported above the guidelines.

INORGANIC & PHYSICAL

CHEMISTRY (LAB)

The results of the chemistry scan showed that no parameters were reported above the guidelines.

METALS

The result of the metal scan showed that no parameters were reported above the guidelines.

ORGANIC

CHLOROAROMATICS

Hexachlorocyclopentadiene was found at a positive level in 1 of 7 treated and distributed water sample with a reported value of 60.0 ug/L. The United States Environmental Protection Agency has an Ambient Water Quality Criteria of 206,000 ng/L.

The results of the other parameters in the chloroaromatic scan showed that none were detected.

CHLOROPHENOLS

The results of the chlorophenol scan showed that none were detected.

POLYAROMATIC HYDROCARBONS (PAH)

The results of the PAH scan showed that none were detected above trace levels.

PESTICIDES & PCB

The results of the PCB scan showed that none were detected.

The results of the regular pesticide scan showed that none were detected above trace levels.

PHENOLICS

Phenolic compounds are present in the aquatic environment as a result of natural and/or industrial processes. The ODWOs recommend, as an operational guideline, that phenolic substances in drinking water not exceed 2.0 ug/L. This limit has been set primarily to prevent undesirable taste and odours, particularly in chlorinated water. No results exceeded the guideline.

SPECIFIC PESTICIDES

The results of the specific pesticides scan showed that none were detected.

VOLATILES

1,1,1-Trichloroethane was found at a positive level in 1 of 25 treated and distributed water samples with a reported value of 0.34 ng/L. The United States Environmental Protection Agency has a Maximum Contaminant Level of 200 ng/L.

The detection of benzene, ethylbenzene, toluene and xylenes at low, trace levels may be a laboratory artifact derived from the analytical methodology.

Trihalomethanes (THMs) are produced during the water treatment process and will always occur in chlorinated waters. THMs are comprised of chloroform, chlorodibromomethane and dichlorobromomethane; bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs. Only total THMs results are discussed.

Total THMs were found at positive levels in the 25 treated and distributed water samples analyzed with a maximum level of 57.5 ug/L. This was below the ODWO Maximum Acceptable Concentration of 350 ug/L.

Chloroform was found at positive levels in one raw water sample and at low trace levels in a number of other samples. The possibility of chlorine backmixing in the raw water well is unlikely, due to, the position of the chlorine addition and velocity of the raw water flow in the well. Further investigation should be carried out to determine the chloroform origin because of the proximity of the treatment plant to a pulp mill.

CONCLUSIONS

The Thunder Bay (Bare Point) water treatment plant, for the sample year 1990, produced good quality water and this was maintained in the distribution system.

No known health related guidelines were exceeded.

FIGURE 1

THUNDER BAY (BARE POINT) WATER TREATMENT PLANT

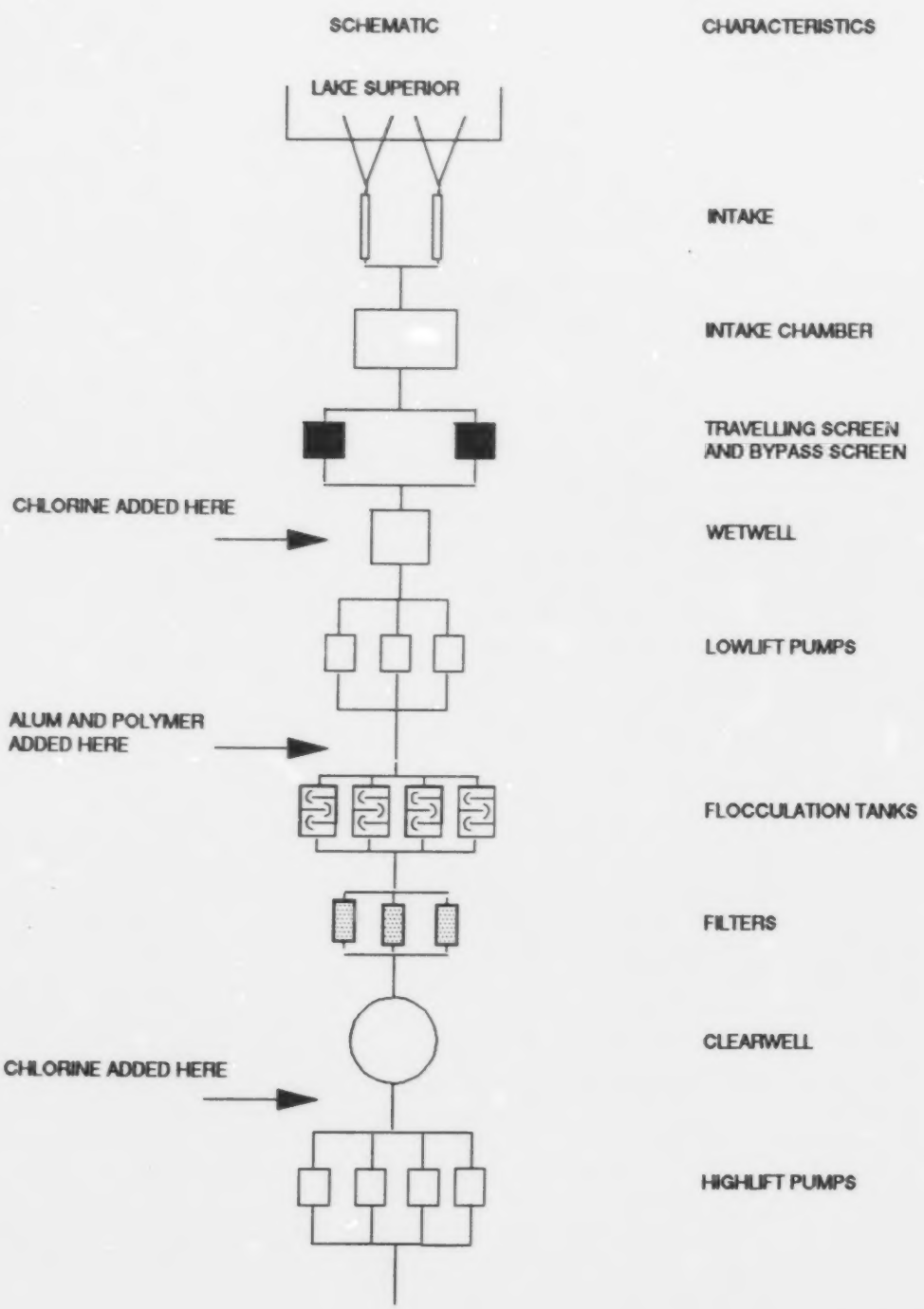

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM

PLANT GENERAL REPORT

WORKS #:	220000273
PLANT NAME:	THUNDER BAY (BARE POINT WTP)
DISTRICT:	THUNDER BAY
REGION:	NORTHWEST
DISTRICT OFFICER:	D. MURRAY
UTM #:	163412005371290
PLANT SUPERINTENDENT:	VEIKKO LONG
ADDRESS:	500 DONALD STREET EAST THUNDER BAY, ONTARIO P7E 5V3 (807)683- 3251
MUNICIPALITY:	THUNDER BAY
AUTHORITY:	MUNICIPAL

PLANT INFORMATION

PLANT VOLUME:	-	(X 1000 M3)
DESIGN CAPACITY:	91.000	(X 1000 M3/DAY)
RATED CAPACITY:	70.460	(X 1000 M3/DAY)

MUNICIPALITY	POPULATION
THUNDER BAY NORTH	64,490

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) SAMPLE DAY CONDITIONS F 1990

			TREATMENT CHEMICAL DOSAGE (MG/L)			
			PRE CHLORINATION	COAGULATION	COAGULATION AID	POST CHLORINATION
DATE	DELAY * TIME(HRS)	FLOW (1000M3)	CHLORINE	ALUM LIQUID	POLYELECTROLYTE	CHLORINE
JAN 09	1.20	35.200	1.06	6.94	.19	.35
FEB 12	1.20	35.000	1.07	4.77	.20	.35
MAR 13	1.20	35.000	.99	3.64	.21	.33
APR 10	1.20	33.000	1.29	5.39	.22	.43
MAY 15	0.75	35.000	1.31	7.40	.20	.44
JUN 12	0.50	34.000	1.83	8.70	.21	1.02
JUL 10	0.50	39.500	1.00	4.73	.22	1.10
SEP 11	0.50	41.120	1.27	8.20	.20	.42
OCT 10	0.50	30.400	1.17	3.77	.20	.39
NOV 14	1.00	33.500	.89	6.81	.24	.29
DEC 11	1.10	32.000	1.10	5.73	.20	.37

* THE DELAY TIME BETWEEN THE RAW AND TREATED WATER SAMPLING, SHOULD ESTIMATE THE RETENTION TIME.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP)
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	RAW			TREATED			SITE 1			SITE 2			SITE 3		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
BACTERIOLOGICAL															
FECAL COLIFORM MF	4	0	0	.	.	.	.	.	.	.	.	.	.	.	.
FECAL COLIFORM	.	.	.	4	0	0	3	0	0	1	0	0	3	0	0
FECAL STREPTO MF	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.
STANDRD PLATE CNT MF	.	.	.	4	0	0	3	1	0	1	1	0	3	1	0
COLIFORM	.	.	.	4	0	0	3	0	0	1	0	0	3	0	0
TOTAL COLIFORM MF	4	1	0	.	.	.	.	.	.	.	.	.	.	.	.
*TOTAL GROUP BACTERIOLOGICAL	8	1	0	12	0	0	9	1	0	3	1	0	9	1	0
CHEMISTRY (FLD)															
FLD CHLORINE (COMB)	.	.	.	11	11	0	3	3	0	.	.	.	9	9	0
FLD CHLORINE FREE	.	.	.	11	11	0	3	3	0	.	.	.	9	9	0
FLD CHLORINE (TOTAL)	.	.	.	11	11	0	3	3	0	.	.	.	9	9	0
FLD PH	11	11	0	11	11	0	3	3	0	.	.	.	10	10	0
FLD TEMPERATURE	11	11	0	11	11	0	3	3	0	.	.	.	1	1	0
FLD TURBIDITY	11	11	0	11	11	0	.	.	.	.	.	.	.	.	.
*TOTAL SCAN CHEMISTRY (FLD)	33	33	0	66	66	0	15	15	0	0	0	0	38	38	0
CHEMISTRY (LAB)															
ALKALINITY	11	11	0	11	11	0	11	11	0	5	5	0	14	14	0
CALCIUM	11	11	0	11	11	0	11	11	0	5	5	0	14	14	0
CYANIDE	11	0	0	11	0	0	.	.	.	.	.	.	.	.	.
CHLORIDE	11	10	1	11	11	0	11	11	0	5	5	0	14	14	0
COLOUR	11	7	4	11	0	10	11	1	10	5	0	3	14	0	14
CONDUCTIVITY	11	11	0	11	11	0	11	11	0	5	5	0	14	14	0
DISS ORG CARBON	11	11	0	11	11	0	11	11	0	5	5	0	14	14	0
FLUORIDE	11	0	11	11	1	10	11	0	11	5	0	5	14	0	14
HARDNESS	11	11	0	11	11	0	11	11	0	5	5	0	14	14	0
IONCAL	11	11	0	11	11	0	11	11	0	6	5	0	14	14	0
LANGELIERS INDEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAGNESIUM	11	11	0	11	11	0	11	11	0	5	5	0	14	14	0
SODIUM	11	11	0	11	11	0	11	11	0	5	5	0	14	14	0
AMMONIUM TOTAL	11	0	3	11	0	1	11	3	2	5	0	3	14	0	4
NITRITE	11	2	9	11	1	1	11	1	5	5	0	2	14	0	6
TOTAL NITRATES	11	11	0	11	11	0	11	11	0	5	5	0	14	14	0
NITROGEN TOT KJELD	11	9	2	11	1	9	11	3	8	5	1	4	14	3	10
PH	11	11	0	11	11	0	11	11	0	5	5	0	14	14	0
PHOSPHORUS FIL REACT	11	0	3	11	0	1	.	.	.	.	.	.	.	.	.
PHOSPHORUS TOTAL	11	0	9	11	0	2	.	.	.	.	.	.	.	.	.
SULPHATE	11	11	0	11	11	0	11	11	0	5	5	0	14	14	0
TURBIDITY	11	11	0	11	7	4	11	11	0	5	3	2	14	9	5
*TOTAL SCAN CHEMISTRY (LAB)	231	160	42	231	142	38	198	151	36	91	64	19	252	180	53

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP)
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	SITE RAW			TREATED			SITE 1			SITE 2			SITE 3		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
METALS															
SILVER	11	0	0	11	0	0	11	0	0	6	0	0	14	0	1
ALUMINUM	11	11	0	11	11	0	11	11	0	6	6	0	14	14	0
ARSENIC	11	0	11	11	0	7	11	0	8	6	0	4	14	0	11
BARIUM	11	11	0	11	11	0	11	11	0	6	6	0	14	14	0
BORON	11	1	10	11	0	11	11	0	11	6	0	6	14	0	14
BERYLLIUM	11	0	0	11	0	0	11	0	1	6	0	0	14	0	1
CADMIUM	11	0	0	11	0	0	11	0	1	6	0	2	14	0	0
COBALT	11	0	11	11	0	11	11	0	11	6	0	6	14	0	14
CHROMIUM	11	0	9	11	1	10	11	0	9	6	0	3	14	0	8
COPPER	11	0	11	11	0	10	11	11	0	6	6	0	14	14	0
IRON	11	1	9	11	0	1	11	0	2	6	0	0	14	0	14
MERCURY	11	1	2	11	1	2	.	.	.	.	.	.	.	.	.
MANGANESE	11	11	0	11	6	5	11	6	5	6	3	3	14	14	0
MOLYBDENUM	11	0	10	11	0	11	11	0	11	6	0	6	14	0	13
NICKEL	11	0	1	11	0	1	11	1	2	6	1	1	14	0	0
LEAD	11	1	4	11	0	3	11	11	0	6	6	0	14	14	0
ANTIMONY	11	1	10	11	1	10	11	0	11	6	0	6	14	0	14
SELENIUM	11	0	1	11	0	0	11	0	0	6	0	0	14	0	0
STRONTIUM	11	11	0	11	11	0	11	11	0	6	6	0	14	14	0
TITANIUM	11	1	10	11	0	11	11	0	11	6	0	6	14	0	14
THALLIUM	11	0	0	11	0	0	11	0	0	6	0	0	14	0	0
URANIUM	11	0	7	11	0	0	11	0	0	6	0	0	14	0	0
VANADIUM	11	1	10	11	5	6	11	5	5	6	0	6	14	0	14
ZINC	11	3	8	11	3	8	11	8	3	6	5	1	14	10	4
*TOTAL SCAN METALS	264	54	124	264	50	107	253	75	91	138	39	50	322	94	122
*TOTAL GROUP INORGANIC & PHYSICAL	528	247	166	561	258	145	466	241	127	229	103	69	612	312	175
CHLOROAROMATICS															
HEXACHLOROBUTADIENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
123 TRICHLOROBENZENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
1234 T-CHLOROBENZENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
1235 T-CHLOROBENZENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
124 TRICHLOROBENZENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
1245 T-CHLOROBENZENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
135 TRICHLOROBENZENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
HCB	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
HEXACHLOROETHANE	11	0	0	10	0	1	6	0	0	3	0	0	7	0	0
OCTACHLOROSTYRENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
PENTACHLOROBENZENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
236 TRICHLOROTOLUENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
245 TRICHLOROTOLUENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
26A TRICHLOROTOLUENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
*TOTAL SCAN CHLOROAROMATICS	154	0	0	140	0	1	84	0	0	42	0	0	98	0	0

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP)
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	SITE RAW			TREATED			SITE 1			SITE 2			SITE 3		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
CHLOROPHENOLS															
234 TRICHLOROPHENOL	1	0	0	1	0	0	.	.	.	.	.	.	.	.	.
2345 T-CHLOROPHENOL	1	0	0	1	0	0	.	.	.	.	.	.	.	.	.
2356 T-CHLOROPHENOL	1	0	0	1	0	0	.	.	.	.	.	.	.	.	.
245-TRICHLOROPHENOL	1	0	0	1	0	0	.	.	.	.	.	.	.	.	.
246-TRICHLOROPHENOL	1	0	0	1	0	0	.	.	.	.	.	.	.	.	.
PENTACHLOROPHENOL	1	0	0	1	0	0	.	.	.	.	.	.	.	.	.
*TOTAL SCAN CHLOROPHENOLS	6	0	0	6	0	0	0	0	0	0	0	0	0	0	0
PAH															
PHENANTHRENE	10	0	1	9	0	0	1	0	1	.	.	.	1	0	1
ANTHRACENE	10	0	0	9	0	0	1	0	0	.	.	.	1	0	0
FLUORANTHENE	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
PYRENE	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
BENZO(A)ANTHRACENE	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
CHRYSENE	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
DIMETH. BENZ(A)ANTHR	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
BENZO(E) PYRENE	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
BENZO(B) FLUORANTHEN	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
PERYLENE	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
BENZO(K) FLUORANTHEN	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
BENZO(A) PYRENE	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
BENZO(G,H,I) PERYLEN	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
DIBENZO(A,H) ANTHRAC	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
INDENO(1,2,3-C,D) PY	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
BENZO(B) CHRYSENE	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
CORONENE	11	0	0	10	0	0	1	0	0	.	.	.	1	0	0
*TOTAL SCAN PAH	185	0	1	168	0	0	17	0	1	0	0	0	17	0	1
PESTICIDES & PCB															
ALDRIN	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
ALPHA BHC	11	0	10	10	0	10	6	0	6	3	0	3	7	0	6
BETA BHC	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
LINDANE	11	0	1	10	0	1	6	0	0	3	0	0	7	0	1
ALPHA CHLORDANE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
GAMMA CHLORDANE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
DIELDRIN	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
METHOXYCHLOR	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
ENDOSULFAN 1	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
ENDOSULFAN II	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
ENDRIN	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
ENDOSULFAN SULPHATE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
HEPTACHLOR EPOXIDE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
HEPTACHLOR	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
MIREX	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
OXYCHLORDANE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
OPDDT	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
PCB	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
DDD	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
PPDDE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP)
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	SITE RAW			TREATED			SITE 1			SITE 2			SITE 3		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PPDDT	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
AMETRINE	11	0	0	11	0	0	.	.	.	.	.	.	.	.	.
ATRAZINE	11	0	0	11	0	0	.	.	.	.	.	.	.	.	.
ATRATONE	11	0	0	11	0	0	.	.	.	.	.	.	.	.	.
CYANAZINE (BLADEX)	11	0	0	11	0	0	.	.	.	.	.	.	.	.	.
DESETHYLATRAZINE	11	0	0	11	0	0	.	.	.	.	.	.	.	.	.
D-ETHYL SIMAZINE	10	0	0	10	0	0	.	.	.	.	.	.	.	.	.
PROMETONE	11	0	0	11	0	0	.	.	.	.	.	.	.	.	.
PROPAZINE	11	0	0	11	0	0	.	.	.	.	.	.	.	.	.
PROMETRYNE	11	0	0	11	0	0	.	.	.	.	.	.	.	.	.
METRIBUZIN (SENCOR)	10	0	0	10	0	0	.	.	.	.	.	.	.	.	.
SIMAZINE	11	0	0	11	0	0	.	.	.	.	.	.	.	.	.
ALACHLOR (LASSO)	11	0	0	11	0	0	.	.	.	.	.	.	.	.	.
METOLACHLOR	11	0	0	11	0	0	.	.	.	.	.	.	.	.	.
HEXACLCYCLOPENTADIEN	3	0	0	3	0	1	2	0	0	2	0	0	2	1	0
*TOTAL SCAN PESTICIDES & PCB	375	0	11	354	0	12	128	0	6	65	0	3	149	1	7
PHENOLICS															
PHENOLICS	11	1	5	11	0	7	.	.	.	.	.	.	.	.	.
*TOTAL SCAN PHENOLICS	11	1	5	11	0	7	0	0	0	0	0	0	0	0	0
SPECIFIC PESTICIDES															
TOXAPHENE	11	0	0	10	0	0	6	0	0	3	0	0	7	0	0
2,4,5-T	1	0	0	1	0	0	.	.	.	.	.	.	.	.	.
2,4-D	1	0	0	1	0	0	.	.	.	.	.	.	.	.	.
2,4-DB	1	0	0	1	0	0	.	.	.	.	.	.	.	.	.
2,4 D PROPIONIC ACID	1	0	0	1	0	0	.	.	.	.	.	.	.	.	.
DICAMBA	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
PICHLORAM	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
SILVEX	1	0	0	1	0	0	.	.	.	.	.	.	.	.	.
DIAZINON	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
DICHLOROVOS	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
CHLORPYRIFOS	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
ETHION	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
AZINPHOS-METHYL	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
MALATHION	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
MEVINPHOS	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
METHYL PARATHION	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
METHYLTRITHION	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
PARATHION	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
PHORATE	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
RELDAN	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
RONNEL	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
AMINOCARB	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
BENOMYL	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
BUX	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
CARBOFURAN	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
CICP	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
DIALLATE	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP)
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	SITE RAW			TREATED			SITE 1			SITE 2			SITE 3		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
EPTAM	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
IPC	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
PROPOXUR	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
CARBARYL	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
BUTYLATE	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
*TOTAL SCAN SPECIFIC PESTICIDES	56	0	0	55	0	0	6	0	0	3	0	0	7	0	0
VOLATILES															
BENZENE	10	0	1	11	0	2	4	0	1	3	0	0	7	0	1
TOLUENE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
ETHYLBENZENE	10	0	5	11	0	6	4	0	3	3	0	0	7	0	5
P-XYLENE	10	0	0	11	0	0	4	0	1	3	0	0	7	0	0
M-XYLENE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
O-XYLENE	10	0	0	11	0	0	4	0	2	3	0	0	7	0	0
STYRENE	10	0	5	11	0	1	4	0	2	3	0	0	7	0	1
1,1 DICHLOROETHYLENE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
METHYLENE CHLORIDE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
T1,2DICHLOROETHYLENE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
1,1 DICHLOROETHANE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
CHLOROFORM	10	1	5	11	11	0	4	4	0	3	3	0	7	7	0
111, TRICHLOROETHANE	10	0	2	11	0	0	4	0	0	3	0	0	7	1	0
1,2 DICHLOROETHANE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
CARBON TETRACHLORIDE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
1,2 DICHLOROPROPANE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
TRICHLOROETHYLENE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
DICHLOROBROMOMETHANE	10	0	0	11	11	0	4	4	0	3	3	0	7	7	0
112 TRICHLOROETHANE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
CHLORODIBROMOMETHANE	10	0	0	11	0	11	4	0	4	3	0	3	7	0	7
T-CHLOROETHYLENE	10	0	2	11	0	1	4	0	0	3	0	0	7	0	0
BROMOFORM	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
1122 T-CHLOROETHANE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
CHLOROBENZENE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
1,4 DICHLOROBENZENE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
1,3 DICHLOROBENZENE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
1,2 DICHLOROBENZENE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
ETHLYENE DIBROMIDE	10	0	0	11	0	0	4	0	0	3	0	0	7	0	0
TOTL TRIHALOMETHANES	10	0	1	11	11	0	4	4	0	3	3	0	7	7	0
*TOTAL SCAN VOLATILES	290	1	21	319	33	21	116	12	13	87	9	3	203	22	14
*TOTAL GROUP ORGANIC	1077	2	38	1053	33	41	351	12	20	197	9	6	474	23	22

KEY TO TABLE 5 and 6

A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
1+. MAC for Total Trihalomethanes
2. Interim Maximum Acceptable Concentration (IMAC)
3. Aesthetic Objective (AO)
3*. AO for Total Xylenes
4. Recommended Operational Guideline

B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC
4. Aesthetic Objective (AO)

C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria
4T. EPA Ambient Water Quality Criteria for Total PAH

F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissable Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

I NEW YORK STATE AMBIENT WATER GUIDELINE

N/A NONE AVAILABLE

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurement Amount
<T	Greater Than Detection Limit But Not Confident (SEE INTERPRETATION OF RESULTS ABOVE)
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!IV	No Data: Inverted Septum
!LA	No Data: Laboratory Accident
!LD	No Data: Test Queued After Sample Discarded
!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!QU	No Data: Quality Control Unacceptable
!PE	No Data: Procedural Error - Sample Discarded
!PH	No Data: Sample pH Outside Valid Range
!RE	No Data: Received Empty
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
!TX	No Data: Time Expired
A3C	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRO	Calculated Result Only
PPS	Test Performed On Preserved Sample
RMP	P and M-Xylene Not Separated
RRV	Rerun Verification
RVU	Reported Value Unusual
SPS	Several Peaks, Small, Not Priority Pollutant

UCR		Unreliable: Could Not Confirm By Reanalysis
UCS		Unreliable: Contamination Suspected
UIN		Unreliable: Indeterminate Interference
XP		Positive After X Number Of Hours
T#	(T06)	Result Taken After # Hours

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
BACTERIOLOGICAL								
FECAL COLIFORM (CT/100ML)			DET'N LIMIT = 0		GUIDELINE = 0 (A1)			
JUN	.	0	.	0	.	.	.	.
JUL	.	0	.	.	.	.	.	0
SEP	.	.	.	0	.	.	.	0
OCT	.	0	.	.	.	.	.	.
DEC	.	0	.	0	.	0	.	0
STAND2D PLATE CNT MF (COUNT/ML)			DET'N LIMIT = 0		GUIDELINE = 500/ML (A3)			
JUN	.	0	.	0	.	.	.	.
JUL	.	0	.	.	.	.	.	0
SEP	.	.	.	0	.	.	.	0
OCT	.	0	.	.	.	.	.	.
DEC	.	0	.	44	.	44	.	1
COLIFORM (CT/100ML)			DET'N LIMIT = 0		GUIDELINE = N/A			
JUN	.	0	.	0	.	.	.	.
JUL	.	0	.	.	.	.	.	0
SEP	.	.	.	0	.	.	.	0
OCT	.	0	.	.	.	.	.	.
DEC	.	0	.	0	.	0	.	0
TOTAL COLIFORM MF (CT/100ML)			DET'N LIMIT = 0		GUIDELINE = 5/100ML(A1)			
JUN	12	.	.	.	.	.	.	.
JUL	BDL	.	.	.	.	.	.	.
OCT	BDL	.	.	.	.	.	.	.
DEC	BDL	.	.	.	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE TYPE	RAW	TREATED	WATER TREATMENT PLANT SITE 1 STANDING	SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	SITE 2 FREE FLOW	SITE 3 STANDING	SITE 3 FREE FLOW
CHEMISTRY (FLD)								
FLD CHLORINE (COMB) (MG/L)			DET'N LIMIT = 0		GUIDELINE = N/A			
JAN	.	.070	.	.400	.	.	.	.100
FEB	.	.100	.	.	.	.	.	.
MAR	.	.200	.	.	.	.	.	.
APR	.	.100	.200	.	.	.	.900	.
MAY	.	.100	.	.	.	.	.	.200
JUN	.	.070	.	.200	.	.	.	.
JUL	.	.200	.	.	.	.	.100	.
SEP	.	.200	.	.	.	.	.200	.200
OCT	.	.070	.	.	.	.	.	.200
NOV	.	.300	.	.	.	.	.	.
DEC	.	.200	.	.	.	.	.100	.100
FLD CHLORINE FREE (MG/L)			DET'N LIMIT = 0		GUIDELINE = N/A			
JAN	.	1.040	.	1.000	.	.	.	.900
FEB	.	1.000	.	.	.	.	.	.
MAR	.	1.000	.	.	.	.	.	.
APR	.	1.000	1.000	.	.	.	.700	.
MAY	.	1.340	.	.	.	.	.	.700
JUN	.	1.010	.	.700	.	.	.	.
JUL	.	1.000	.	.	.	.	.900	.
SEP	.	.900	.	.	.	.	.500	.500
OCT	.	1.020	.	.	.	.	.	.700
NOV	.	.800	.	.	.	.	.	.
DEC	.	1.200	.	.	.	.	.900	.900
FLD CHLORINE (TOTAL) (MG/L)			DET'N LIMIT = 0		GUIDELINE = N/A			
JAN	.	1.110	.	1.400	.	.	.	1.000
FEB	.	1.100	.	.	.	.	.	.
MAR	.	1.200	.	.	.	.	.	.
APR	.	1.100	1.200	.	.	.	1.600	.
MAY	.	1.440	.	.	.	.	.	.900
JUN	.	1.080	.	.900	.	.	.	.
JUL	.	1.200	.	.	.	.	1.000	.
SEP	.	1.100	.	.	.	.	.700	.700
OCT	.	1.090	.	.	.	.	.	.900
NOV	.	1.100	.	.	.	.	.	.
DEC	.	1.400	.	.	.	.	1.000	1.000

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE RAW TYPE	TREATED	WATER TREATMENT PLANT SITE 1 STANDING	WATER TREATMENT PLANT SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW
FLD PH (DIMNSLESS)		DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5(A4)				
JAN	7.200	7.500	.	7.400	.	.	.
FEB	7.100	7.400	.	.	.	.	6.800
MAR	7.300	7.500	.	.	.	.	.
APR	7.400	7.500	8.000	.	.	.	.
MAY	7.500	7.000	.	.	.	6.800	.
JUN	7.400	7.200	.	7.200	.	6.800	6.800
JUL	7.300	7.500	.	.	.	.	.
SEP	7.300	7.100	.	.	.	6.900	.
OCT	7.600	7.300	.	.	.	7.200	7.200
NOV	7.490	7.310	.	.	.	.	7.000
DEC	6.900	7.100	.	.	.	.	.
						6.800	6.800
FLD TEMPERATURE (DEG.C)		DET'N LIMIT = N/A	GUIDELINE = 15 (A3)				
JAN	4.000	4.000	.	4.000	.	.	.
FEB	3.000	3.000	.	.	.	.	.
MAR	3.000	3.000	.	.	.	.	.
APR	3.000	3.000	3.000	.	.	.	.
MAY	7.000	7.000	.	.	.	.	.
JUN	9.000	9.000	.	8.000	.	.	.
JUL	8.000	8.000	.	.	.	.	.
SEP	13.000	13.000	.	.	.	11.000	.
OCT	11.000	11.000	.	.	.	.	.
NOV	8.000	8.000	.	.	.	.	.
DEC	4.000	4.000	.	.	.	.	.
FLD TURBIDITY (FTU)		DET'N LIMIT = N/A	GUIDELINE = 1 (A1)				
JAN	.490	.040	.	.	.	.	.
FEB	.300	.080	.	.	.	.	.
MAR	.480	.040	.	.	.	.	.
APR	.940	.130	.	.	.	.	.
MAY	.940	.350	.	.	.	.	.
JUN	7.600	.110	.	.	.	.	.
JUL	.840	.150	.	.	.	.	.
SEP	3.500	.100	.	.	.	.	.
OCT	1.100	.080	.	.	.	.	.
NOV	1.700	.120	.	.	.	.	.
DEC	.860	.100	.	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE	RAW	TREATED	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
			SITE 1		SITE 2		SITE 3	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
CHEMISTRY (LAB)								
ALKALINITY (MG/L)			DET'N LIMIT = 0.2		GUIDELINE = 30-500 (A3)			
JAN	46.300	41.100	42.200	42.700	.	.	40.900	41.200
FEB	45.900	41.300	.	.	.	.	.	.
MAR	45.500	41.600	.	.	.	.	.	.
APR	44.700	37.100	39.500	39.700	.	.	38.000	38.600
MAY	44.000	37.500	.	.	.	.	37.700	37.600
JUN	44.400	36.000	40.000	40.300	.	.	.	.
JUL	44.900	41.000	.	.	40.200	IUR	39.200	40.300
SEP	45.200	39.200	42.800	40.900	.	.	39.900	40.400
OCT	46.700	44.400	43.600	43.500	.	.	42.400	42.500
NOV	47.800	43.800	.	.	40.900	40.700	.	.
DEC	45.700	39.700	.	39.100	39.600	39.100	40.200	41.000
CALCIUM (MG/L)			DET'N LIMIT = 0.2		GUIDELINE = 100 (F2)			
JAN	16.230	16.300	16.700	16.900	.	.	16.100	16.300
FEB	14.900	15.800	.	.	.	.	.	.
MAR	15.200	15.800	.	.	.	.	.	.
APR	15.800	16.200	16.600	17.000	.	.	16.000	16.200
MAY	14.200	14.300	.	.	.	.	14.200	14.000
JUN	15.200	14.800	16.200	16.400	.	.	.	.
JUL	15.600	15.000	.	.	17.000	IUR	15.200	15.800
SEP	14.600	14.900	16.500	16.300	.	.	15.300	15.600
OCT	16.300	16.300	16.000	15.800	.	.	14.900	15.000
NOV	16.600	16.800	.	.	14.000	14.000	.	.
DEC	15.900	16.000	.	13.400	15.300	13.400	15.600	15.800
CHLORIDE (MG/L)			DET'N LIMIT = 0.2		GUIDELINE = 250 (A3)			
JAN	1.500	2.600	2.900	2.700	.	.	2.700	2.800
FEB	.700 <T	2.600	.	.	.	.	.	.
MAR	1.600	2.800	.	.	.	.	.	.
APR	2.100	3.500	3.900	3.900	.	.	3.800	3.800
MAY	1.600	3.600	.	.	.	.	3.200	3.100
JUN	2.500	4.000	4.000	4.000	.	.	.	.
JUL	1.100	2.400	.	.	3.200	IUR	2.600	2.600
SEP	1.700	3.000	3.100	3.200	.	.	3.100	3.200
OCT	1.600	2.800	2.600	2.800	.	.	3.000	2.900
NOV	1.800	2.400	.	.	2.400	2.200	.	.
DEC	1.600	3.000	.	3.000	3.000	3.000	3.200	3.200

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE TYPE	RAW	TREATED	WATER TREATMENT PLANT SITE 1 STANDING	WATER TREATMENT PLANT SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW
COLOUR (HZU)			DET'N LIMIT = 0.5	GUIDELINE = 5 (A3)				
JAN	2.000 <T	.500 <T	1.000 <T	.500 <T	.	.	1.500 <T	1.000 <T
FEB	2.000 <T	.500 <T	.	.	.	.	.	.
MAR	2.000 <T	.500 <T	.	.	.	.	.	.
APR	4.500	.500 <T	2.500	2.000 <T	.	.	2.000 <T	2.000 <T
MAY	3.500	BDL	.	.	.	.	1.000 <T	1.000 <T
JUN	5.500	.500 <T	.500 <T	.500 <T	.	.	.	.
JUL	2.000 <T	.500 <T	.	.	BDL	IUR	1.000 <T	.500 <T
SEP	2.500	1.000 <T	.500 <T	1.000 <T	.	.	1.000 <T	1.500 <T
OCT	2.500	.500 <T	.500 <T	.500 <T	.	.	.500 <T	.500 <T
NOV	2.500	.500 <T	.	.	1.000 <T	BDL	.	.
DEC	3.000	.500 <T	.	1.500 <T	1.500 <T	1.500 <T	1.000 <T	1.000 <T
CONDUCTIVITY (UMHO/CM)			DET'N LIMIT = 1.	GUIDELINE = 400 (F2)				
JAN	104	107	112	110	.	.	107	108
FEB	102	105	.	.	.	.	.	.
MAR	103	107	.	.	.	.	.	.
APR	107	112	116	117	.	.	112	112
MAY	102	112	.	.	.	.	105	105
JUN	106	110	121	116	.	.	.	.
JUL	102	106	.	.	114	IUR	104	105
SEP	104	108	116	110	.	.	108	108
OCT	102	104	110	110	.	.	107	107
NOV	105	106	.	.	107	106	.	.
DEC	104	108	.	106	106	106	108	114
DISS ORG CARBON (MG/L)			DET'N LIMIT = .100	GUIDELINE = 5.0 (A3)				
JAN	1.500	1.200	1.300	1.200	.	.	1.100	1.100
FEB	1.400	1.000	.	.	.	.	.	.
MAR	1.600	1.300	.	.	.	.	.	.
APR	2.300	1.600	2.600	2.400	.	.	1.700	1.700
MAY	2.000	1.900	.	.	.	.	2.000	1.700
JUN	2.400	1.700	2.000	1.700	.	.	.	.
JUL	1.500	1.100	.	.	1.500	IUR	1.600	1.500
SEP	1.600	1.300	1.300	1.500	.	.	1.200	1.200
OCT	1.500	1.400	1.500	1.500	.	.	1.400	1.300
NOV	1.500	1.300	.	.	1.400	1.500	.	.
DEC	1.400	1.200	.	1.800	1.800	1.800	1.300	1.200

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE / RAW TYPE	TREATED	WATER TREATMENT PLANT SITE 1 STANDING	WATER TREATMENT PLANT SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW
FLUORIDE (MG/L)		**DET'N LIMIT = 0.01**	**GUIDELINE = 2.4 (A1)**				
JAN	.040 <T	.040 <T	.020 <T	.	.	.040 <T	.040 <T
FEB	.040 <T	.	.	.	.	.	.
MAR	.020 <T	.	.	.	.	.	.
APR	.040 <T	.020 <T	.020 <T	.	.	.020 <T	.020 <T
MAY	.040 <T	.	.	.	.	.040 <T	.040 <T
JUN	.040 <T	.040 <T	.040 <T	.	.	.	.
JUL	.040 <T	.	.	.040 <T	IUR	.020 <T	.040 <T
SEP	.040 <T	.040 <T	.020 <T	.	.	.020 <T	.020 <T
OCT	.040 <T	.040 <T	.040 <T	.	.	.040 <T	.040 <T
NOV	.040 <T	.	.	.020 <T	.020 <T	.	.
DEC	.040 <T	.	.040 <T	.040 <T	.040 <T	.040 <T	.040 <T
HARDNESS (MG/L)		**DET'N LIMIT = 0.5**	**GUIDELINE = 80-100 (A4)**				
JAN	52.500	53.900	54.300	.	.	52.300	52.700
FEB	49.900	51.800	.	.	.	.	.
MAR	50.300	52.200	.	.	.	.	.
APR	52.000	53.000	55.000	55.000	.	53.000	53.000
MAY	46.800	46.910	.	.	.	47.000	46.500
JUN	50.000	49.000	53.000	53.000	.	.	.
JUL	52.000	50.000	.	.	55.000	51.000	52.000
SEP	49.500	49.500	53.500	52.600	IUR	50.900	51.800
OCT	54.100	53.800	50.900	50.400	.	48.500	49.200
NOV	54.000	55.000	.	.	46.000	46.000	.
DEC	52.700	52.400	.	44.000	49.900	44.000	49.000	50.000
IONCAL (DMNSLESS)		**DET'N LIMIT = N/A**	**GUIDELINE = N/A**				
JAN	4.176	5.691	3.701	4.904	.	.	5.229	4.951
FEB	4.413	6.218	.	.	.	.	.	.
MAR	1.613	6.173	.	.	.	.	.	.
APR	5.925	5.618	6.547	7.213	.	.	6.075	6.187
MAY	3.184	4.281	.	.	.	.	2.267	3.271
JUN	2.737	2.304	.416	.794	.	.	.	.
JUL	8.059	2.808	.	.	7.423	.000	6.497	8.532
SEP	3.035	2.833	4.389	6.764	.	.	6.176	5.468
OCT	6.692	4.297	2.702	1.485	.	.	.752	.518
NOV	3.224	5.660	.	.	2.334	.374	.	.
DEC	6.062	6.859	.	5.563	4.473	5.563	1.603	.806

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE / TYPE	RAW	TREATED	WATER TREATMENT PLANT SITE 1 STANDING	WATER TREATMENT PLANT SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW
LANGELIERS INDEX (DIMNSLESS)			**DET'N LIMIT = N/A**	**GUIDELINE = N/A**				
JAN	-.533	-.735	-.635	-.654	.	.	-.602	-.704
FEB	-.533	-.665	.	.	.	.	.	.
MAR	-.599	-.703	.	.	.	.	.	.
APR	-.682	-1.094	-.938	-.906	.	.	-1.059	-1.007
MAY	-.653	-1.064	.	.	.	.	-1.111	-1.128
JUN	-.611	-1.045	-.665	-.685	.	.	.	.
JUL	-.503	-.621	.	.	-.859	.	-.874	-.746
SEP	-.510	-.745	-.836	-.718	.	.	-.805	-.792
OCT	-.537	-.750	-.508	-.505	.	.	-.580	-.626
NOV	-.400	-.683	.	.	-.683	-.654	.	.
DEC	-.558	-.738	.	-.781	-.728	-.781	-.714	-.612
MAGNESIUM (MG/L)			**DET'N LIMIT = 0.10**	**GUIDELINE = 30 (F2)**				
JAN	2.900	2.950	2.950	2.900	.	.	2.950	2.950
FEB	3.050	3.000	.	.	.	.	.	.
MAR	3.000	3.100	.	.	.	.	.	.
APR	3.000	3.000	3.100	3.000	.	.	3.100	3.100
MAY	2.750	2.700	.	.	.	.	2.800	2.750
JUN	2.900	3.000	2.900	2.800	.	.	.	.
JUL	3.200	2.900	.	.	3.000	IUR	3.100	3.000
SEP	3.150	3.000	2.950	2.900	.	.	3.100	3.100
OCT	3.250	3.150	2.700	2.650	.	.	2.800	2.850
NOV	3.100	3.100	.	.	2.800	2.900	.	.
DEC	3.150	3.050	.	2.500	2.850	2.500	2.600	2.600
SODIUM (MG/L)			**DET'N LIMIT = 0.2**	**GUIDELINE = 200 (A4)**				
JAN	1.500	1.500	1.500	1.500	.	.	1.500	1.500
FEB	2.300	2.300	.	.	.	.	.	.
MAR	1.400	1.600	.	.	.	.	.	.
APR	2.200	2.200	2.400	2.400	.	.	2.000	2.000
MAY	1.400	1.500	.	.	.	.	1.500	1.500
JUN	2.200	2.200	2.200	2.200	.	.	.	.
JUL	1.600	1.800	.	.	2.200	IUR	1.800	1.800
SEP	2.100	1.900	2.300	2.200	.	.	2.300	2.100
OCT	2.100	2.000	1.700	1.800	.	.	1.500	1.500
NOV	1.400	1.400	.	.	2.000	2.000	.	.
DEC	1.500	1.600	.	2.200	2.000	2.200	1.800	1.800

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE	RAW	TREATED	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
			SITE 1		SITE 2		SITE 3	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
AMMONIUM TOTAL (MG/L)			DET'N LIMIT = 0.002		GUIDELINE = 0.05 (F2)			
JAN	BDL	BDL	.046	BDL	.	.	BDL	BDL
FEB	BDL	BDL	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	.002 <T	BDL	.002 <T	.002 <T	.	.	.004 <T	.002 <T
MAY	BDL	BDL	.	.	.	.	BDL	BDL
JUN	BDL	BDL	.398	BDL	.	.	.	.
JUL	BDL	BDL	.	.	.004 <T	IUR	BDL	BDL
SEP	BDL	BDL	BDL	BDL	.	.	BDL	BDL
OCT	.002 <T	.006 <T	.010	BDL	.	.	.004 <T	.002 <T
NOV	.002 <T	BDL	.	.	.004 <T	.002 <T	.	.
DEC	BDL	BDL	.	BDL	BDL	BDL	BDL	BDL
NITRITE (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = 1 (A1)			
JAN	.003 <T	BDL	.001 <T	BDL	.	.	.001 <T	.002 <T
FEB	.001 <T	BDL	.	.	.	.	.	.
MAR	.006	BDL	.	.	.	.	.	.
APR	.002 <T	BDL	BDL	BDL	.	.	BDL	BDL
MAY	.003 <T	BDL	.	.	.	.	.001 <T	BDL
JUN	.003 <T	BDL	.005	.003 <T	.	.	.	.
JUL	.003 <T	BDL	.	.	.001 <T	IUR	.001 <T	.002 <T
SEP	.007	.006	.002 <T	.002 <T	.	.	BDL	BDL
OCT	.001 <T	BDL	.001 <T	BDL	.	.	.001 <T	BDL
NOV	.002 <T	.001 <T	.	.	.001 <T	BDL	.	.
DEC	.001 <T	BDL	.	BDL	BDL	BDL	BDL	BDL
TOTAL NITRATES (MG/L)			DET'N LIMIT = 0.005		GUIDELINE = 10 (A1)			
JAN	.335	.330	.530	.330	.	.	.325	.330
FEB	.330	.330	.	.	.	.	.	.
MAR	.345	.345	.	.	.	.	.	.
APR	.295	.320	.315	.315	.	.	.315	.310
MAY	.325	.330	.	.	.	.	.325	.330
JUN	.280	.285	.840	.290	.	.	.	.
JUL	.340	.330	.	.	.300	IUR	.745	.420
SEP	.285	.285	.270	.260	.	.	.280	.280
OCT	.290	.285	.290	.285	.	.	.285	.285
NOV	.310	.310	.	.	.285	.280	.	.
DEC	.310	.320	.	.280	.285	.280	.310	.310

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE / RAW TYPE		TREATED	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
			SITE 1		SITE 2		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
NITROGEN TOT KJELD (MG/L)			DET'N LIMIT = 0.02		GUIDELINE = N/A			
JAN	.130	.090 <T	.190	.080 <T	.	.	.320	.110
FEB	.130	.050 <T	.	.	.	.	.	.
MAR	.110	.070 <T	.	.	.	.	.080 <T	.050 <T
APR	.100	.050 <T	.080 <T	.050 <T	.	.	.060 <T	.070 <T
MAY	.100	.040 <T	.	.	.	.	.	.
JUN	.180	.100	.580	.070 <T	.100	IUR	.090 <T	.110
JUL	.130	.080 <T	.	.	.	.	.070 <T	.040 <T
SEP	.090 <T	.050 <T	.070 <T	.070 <T	.	.	.070 <T	.090 <T
OCT	.130	.090 <T	.100	.080 <T	.	.	.	.
NOV	.110	.050 <T	.	.	.090 <T	.090 <T	BDL	.020 <T
DEC	.060 <T	BDL	.	.060 <T	.050 <T	.060 <T		
PH (DIMNSLESS)			DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5(A4)			
JAN	7.950	7.800	7.880	7.850	.	.	7.940	7.830
FEB	7.990	7.880	.	.	.	.	.	.
MAR	7.920	7.840	.	.	.	.	.	.
APR	7.830	7.490	7.610	7.630	.	.	7.520	7.560
MAY	7.910	7.570	.	.	.	.	7.520	7.510
JUN	7.920	7.590	7.890	7.860	.	.	.	.
JUL	8.010	7.950	.	.	7.670	.	7.710	7.810
SEP	8.030	7.850	7.680	7.820	.	.	7.770	7.770
OCT	7.940	7.750	8.010	8.020	.	.	7.980	7.930
NOV	8.060	7.810	.	.	7.920	7.950	.	.
DEC	7.940	7.820	.	7.860	7.850	7.860	7.850	7.940
PHOSPHORUS FIL REACT (MG/L)			DET'N LIMIT = 0.0005		GUIDELINE = N/A			
JAN	BDL	BDL	.	.	.	.	.	.
FEB	BDL	BDL	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	.001 <T	.001 <T	.	.	.	.	.	.
MAY	BDL	BDL	.	.	.	.	.	.
JUN	BDL	BDL	.	.	.	.	.	.
JUL	BDL	BDL	.	.	.	.	.	.
SEP	BDL	BDL	.	.	.	.	.	.
OCT	BDL	BDL	.	.	.	.	.	.
NOV	.000 <T	BDL	.	.	.	.	.	.
DEC	.000 <T	BDL	.	.	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

	SITE RAW TYPE	TREATED	WATER TREATMENT PLANT SITE 1 STANDING	SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	SITE 2 FREE FLOW	SITE 3 STANDING	SITE 3 FREE FLOW
PHOSPHORUS TOTAL (MG/L)			DET'N LIMIT = 0.002		GUIDELINE = .40 (F2)			
JAN	.005 <T	.005 <T	.	.	.	.	.	.
FEB	.003 <T	.002 <T	.	.	.	.	.	.
MAR	.002 <T	BDL	.	.	.	.	.	.
APR	.005 <T	BDL	.	.	.	.	.	.
MAY	.003 <T	BDL	.	.	.	.	.	.
JUN	.003 <T	BDL	.	.	.	.	.	.
JUL	.005 <T	BDL	.	.	.	.	.	.
SEP	BDL	BDL	.	.	.	.	.	.
OCT	.005 <T	BDL	.	.	.	.	.	.
NOV	.003 <T	BDL	.	.	.	.	.	.
DEC	BDL	BDL	.	.	.	.	.	.
SULPHATE (MG/L)			DET'N LIMIT = .200		GUIDELINE = 500 (A3)			
JAN	3.690	6.830	6.730	6.720	.	.	6.660	6.820
FEB	4.170	7.010	.	.	.	.	.	.
MAR	3.340	5.420	.	.	.	.	.	.
APR	4.500	10.880	9.260	9.260	.	.	8.940	8.770
MAY	3.800	8.120	.	.	.	.	7.680	7.680
JUN	4.090	9.790	9.290	9.410	.	.	.	.
JUL	3.600	6.000	.	.	9.290	IUR	5.520	5.610
SEP	3.590	7.420	7.430	7.120	.	.	7.120	7.130
OCT	4.750	6.010	4.810	4.770	.	.	4.520	4.360
NOV	3.820	6.090	.	.	6.430	6.340	.	.
DEC	3.490	7.000	.	6.600	6.800	6.600	6.600	6.700
TURBIDITY (FTU)			DET'N LIMIT = 0.05		GUIDELINE = 1 (A1)			
JAN	.540	.320	.870	.330	.	.	.290	.180 <T
FEB	.540	.500	.	.	.	.	.	.
MAR	.970	.140 <T	.	.	.	.	.	.
APR	1.100	.210	.520	.300	.	.	.280	.310
MAY	.830	.300	.	.	.	.	.190	.170
JUN	.830	.190 <T	.600	.250	.	.	.	.
JUL	.610	.140 <T	.	.	2.500	IUR	.170 <T	.130 <T
SEP	4.600	.600	.320	.340	.	.	.210	.250
OCT	.780	.240 <T	.400	.250	.	.	.170 <T	.180 <T
NOV	1.600	.670	.	.	.210 <T	.250 <T	.	.
DEC	1.720	.110	.	.210	.310	.210	.310	.360

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

	SITE RAW TYPE	TREATED	WATER TREATMENT PLANT SITE 1 STANDING	SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	SITE 2 FREE FLOW	SITE 3 STANDING	SITE 3 FREE FLOW
METALS								
SILVER (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 50 (A1)			
JAN	BDL	BDL	BDL	BDL	.	.	BDL	BDL
FEB	BDL	BDL	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	BDL	BDL	BDL	BDL	.	.	BDL	.060 <T
MAY	BDL	BDL	.	.	.	.	BDL	BDL
JUN	BDL	BDL	BDL	BDL	.	.	.	.
JUL	BDL	BDL	.	.	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	.	.	BDL	BDL
OCT	BDL	BDL	BDL	BDL	.	.	BDL	BDL
NOV	BDL	BDL	.	.	BDL	BDL	.	.
DEC	BDL	BDL	.	BDL	BDL	BDL	BDL	BDL
ALUMINUM (UG/L)			DET'N LIMIT = 0.10		GUIDELINE = 100 (A4)			
JAN	8.100	20.000	23.000	17.000	.	.	16.000	16.000
FEB	8.100	25.000	.	.	.	.	.	.
MAR	7.600	22.000	.	.	.	.	.	.
APR	18.000	35.000	49.000	51.000	.	.	41.000	44.000
MAY	27.000	33.000	.	.	.	.	31.000	30.000
JUN	38.000	39.000	39.000	36.000	.	.	.	.
JUL	17.000	32.000	.	.	25.000	33.000	40.000	41.000
SEP	66.000	36.000	11.000	37.000	.	.	29.000	28.000
OCT	20.000	56.000	47.000	50.000	.	.	38.000	44.000
NOV	27.000	28.000	.	.	24.000	22.000	.	.
DEC	12.000	24.000	.	18.000	18.000	18.000	17.000	17.000
ARSENIC (UG/L)			DET'N LIMIT = 0.10		GUIDELINE = 25 (A1)			
JAN	.380 <T	BDL	.190 <T	.140 <T	.	.	BDL	.190 <T
FEB	.420 <T	BDL	.	.	.	.	.	.
MAR	.810 <T	.290 <T	.	.	.	.	.	.
APR	.510 <T	.290 <T	.290 <T	.330 <T	.	.	.270 <T	.260 <T
MAY	.420 <T	BDL	.	.	.	.	.210 <T	.120 <T
JUN	.250 <T	.180 <T	.260 <T	.170 <T	.	.	.	.
JUL	.360 <T	.160 <T	.	.	BDL	.260 <T	.190 <T	.210 <T
SEP	.560 <T	BDL	BDL	BDL	.	.	BDL	BDL
OCT	.460 <T	.310 <T	.260 <T	.260 <T	.	.	.240 <T	.260 <T
NOV	.650 <T	.290 <T	.	.	.360 <T	.310 <T	.	.
DEC	.390 <T	.160 <T	.	BDL	.130 <T	BDL	.110 <T	.160 <T

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
SITE			SITE 1		SITE 2		SITE 3	
RAW TYPE	TREATED		STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
BARIUM (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 1000 (A2)			
JAN	9.600	9.500	10.000	10.000	.	.	10.000	10.000
FEB	12.000	11.000	.	.	.	.	.	.
MAR	9.900	9.900	.	.	.	.	.	.
APR	10.000	10.000	11.000	11.000	.	.	10.000	10.000
MAY	11.000	10.000	.	.	.	.	10.000	10.000
JUN	10.000	10.000	12.000	12.000	.	.	.	.
JUL	11.000	10.000	.	.	11.000	11.000	10.000	10.000
SEP	13.000	13.000	13.000	13.000	.	.	12.000	12.000
OCT	11.000	10.000	11.000	10.000	.	.	9.800	9.900
NOV	10.000	10.000	.	.	9.900	9.700	.	.
DEC	10.000	9.600	.	9.500	9.300	9.500	9.500	9.600
BORON (UG/L)			DET'N LIMIT = 2.00		GUIDELINE = 5000 (A1)			
JAN	11.000 <T	6.700 <T	11.000 <T	7.300 <T	.	.	7.100 <T	6.200 <T
FEB	7.200 <T	7.100 <T	.	.	.	.	.	.
MAR	12.000 <T	10.000 <T	.	.	.	.	.	.
APR	14.000 <T	14.000 <T	13.000 <T	13.000 <T	.	.	13.000 <T	13.000 <T
MAY	23.000	10.000 <T	.	.	.	.	20.000 <T	7.400 <T
JUN	12.000 <T	12.000 <T	12.000 <T	12.000 <T	.	.	.	.
JUL	9.800 <T	9.800 <T	.	.	9.800 <T	7.400 <T	5.900 <T	9.900 <T
SEP	11.000 <T	13.000 <T	14.000 <T	12.000 <T	.	.	13.000 <T	6.800 <T
OCT	8.000 <T	7.900 <T	7.600 <T	7.700 <T	.	.	7.900 <T	7.800 <T
NOV	5.300 <T	6.200 <T	.	.	5.000 <T	5.700 <T	.	.
DEC	7.500 <T	12.000 <T	.	7.500 <T	9.500 <T	7.500 <T	6.700 <T	8.500 <T
BERYLLIUM (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 6800 (D4)			
JAN	BDL	BDL	.060 <T	BDL	.	.	BDL	BDL
FEB	BDL	BDL	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	BDL	BDL	BDL	BDL	.	.	BDL	BDL
MAY	BDL	BDL	.	.	.	.	BDL	.060 <T
JUN	BDL	BDL	BDL	BDL	.	.	.	.
JUL	BDL	BDL	.	.	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	.	.	BDL	BDL
OCT	BDL	BDL	BDL	BDL	.	.	BDL	BDL
NOV	BDL	BDL	.	.	BDL	BDL	.	.
DEC	BDL	BDL	.	BDL	BDL	BDL	BDL	BDL

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE / RAW TYPE	TREATED	WATER TREATMENT PLANT SITE 1 STANDING	WATER TREATMENT PLANT SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW
CADMIUM (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 5 (A1)				
JAN	BDL	BDL	BDL	.	.	BDL	BDL
FEB	BDL	.	.	.	.	.	.
MAR	BDL	.	.	.	.	.	.
APR	BDL	BDL	BDL	.	.	BDL	BDL
MAY	BDL	.	.	.	.	BDL	BDL
JUN	BDL	BDL	BDL	.	.	.	.
JUL	BDL	.	.	.180 <T	BDL	BDL	BDL
SEP	BDL	BDL	BDL	.	.	BDL	BDL
OCT	BDL	BDL	BDL	.	.	BDL	BDL
NOV	BDL	.	.	BDL	BDL	.	.
DEC	BDL	.	.070 <T	BDL	.070 <T	BDL	BDL
COBALT (UG/L)		DET'N LIMIT = 0.02	GUIDELINE = N/A				
JAN	.030 <T	.070 <T	.060 <T	.	.	.040 <T	.040 <T
FEB	.070 <T	.100 <T	.	.	.	.	.
MAR	.070 <T	.080 <T	.	.	.	.	.
APR	.040 <T	.080 <T	.070 <T	.	.	.070 <T	.060 <T
MAY	.080 <T	.060 <T	.	.	.	.070 <T	.060 <T
JUN	.070 <T	.060 <T	.100 <T	.090 <T	.	.	.
JUL	.100 <T	.100 <T	.	.	.070 <T	.070 <T	.080 <T
SEP	.070 <T	.060 <T	.200 <T	.050 <T	.	.	.090 <T
OCT	.120 <T	.080 <T	.160 <T	.070 <T	.	.	.060 <T
NOV	.030 <T	.050 <T	.	.	.050 <T	.060 <T	.
DEC	.070 <T	.040 <T	.	.030 <T	.050 <T	.030 <T	.050 <T
CHROMIUM (UG/L)		DET'N LIMIT = 0.50	GUIDELINE = 50 (A1)				
JAN	1.300 <T	23.000	1.200 <T	BDL	.	.	BDL
FEB	1.700 <T	1.000 <T	.	.	.	.	.
MAR	.790 <T	.800 <T	.	.	.	.	.
APR	1.300 <T	1.700 <T	1.500 <T	1.500 <T	.	.	1.600 <T
MAY	.570 <T	.680 <T	.	.	.	.	.930 <T
JUN	1.700 <T	1.600 <T	1.600 <T	1.500 <T	.	.	.
JUL	.960 <T	1.100 <T	.	.	1.000 <T	.560 <T	BDL
SEP	1.200 <T	1.700 <T	1.700 <T	1.400 <T	.	.	1.700 <T
OCT	1.000 <T	1.000 <T	.950 <T	.890 <T	.	.	1.100 <T
NOV	BDL	.730 <T	.	.	BDL	.710 <T	.
DEC	BDL	.970 <T	.	BDL	BDL	BDL	BDL

SITE / RAW TYPE	TREATED	WATER TREATMENT PLANT SITE 1 STANDING	WATER TREATMENT PLANT SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW
CADMIUM (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 5 (A1)				
JAN	BDL	BDL	BDL	.	.	BDL	BDL
FEB	BDL	.	.	.	.	.	.
MAR	BDL	.	.	.	.	.	.
APR	BDL	BDL	BDL	.	.	BDL	BDL
MAY	BDL	.	.	.	.	BDL	BDL
JUN	BDL	BDL	BDL	.	.	.	.
JUL	BDL	.	.	.180 <T	BDL	BDL	BDL
SEP	BDL	BDL	BDL	.	.	BDL	BDL
OCT	BDL	BDL	BDL	.	.	BDL	BDL
NOV	BDL	.	.	BDL	BDL	.	.
DEC	BDL	.	.070 <T	BDL	.070 <T	BDL	BDL
COBALT (UG/L)		DET'N LIMIT = 0.02	GUIDELINE = N/A				
JAN	.030 <T	.070 <T	.060 <T	.	.	.040 <T	.040 <T
FEB	.070 <T	.100 <T	.	.	.	.	.
MAR	.070 <T	.080 <T	.	.	.	.	.
APR	.040 <T	.080 <T	.070 <T	.	.	.070 <T	.060 <T
MAY	.080 <T	.060 <T	.	.	.	.070 <T	.060 <T
JUN	.070 <T	.060 <T	.100 <T	.090 <T	.	.	.
JUL	.100 <T	.100 <T	.	.	.070 <T	.070 <T	.080 <T
SEP	.070 <T	.060 <T	.200 <T	.050 <T	.	.	.090 <T
OCT	.120 <T	.080 <T	.160 <T	.070 <T	.	.	.060 <T
NOV	.030 <T	.050 <T	.	.	.050 <T	.060 <T	.
DEC	.070 <T	.040 <T	.	.030 <T	.050 <T	.030 <T	.050 <T
CHROMIUM (UG/L)		DET'N LIMIT = 0.50	GUIDELINE = 50 (A1)				
JAN	1.300 <T	23.000	1.200 <T	BDL	.	.	BDL
FEB	1.700 <T	1.000 <T	.	.	.	.	.
MAR	.790 <T	.800 <T	.	.	.	.	.
APR	1.300 <T	1.700 <T	1.500 <T	1.500 <T	.	.	1.600 <T
MAY	.570 <T	.680 <T	.	.	.	.	.930 <T
JUN	1.700 <T	1.600 <T	1.600 <T	1.500 <T	.	.	.
JUL	.960 <T	1.100 <T	.	.	1.000 <T	.560 <T	BDL
SEP	1.200 <T	1.700 <T	1.700 <T	1.400 <T	.	.	1.700 <T
OCT	1.000 <T	1.000 <T	.950 <T	.890 <T	.	.	1.100 <T
NOV	BDL	.730 <T	.	.	BDL	.710 <T	.
DEC	BDL	.970 <T	.	BDL	BDL	BDL	BDL

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE			SITE 1		SITE 2		SITE 3	
RAW TYPE	TREATED		STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
COPPER (UG/L)			DET'N LIMIT = 0.50		GUIDELINE = 1000 (A3)			
JAN	.860 <T	.670 <T	80.000	22.000	.	.	13.000	12.000
FEB	1.400 <T	1.100 <T	.	.	.	.	.	.
MAR	.950 <T	.640 <T	.	.	.	.	.	.
APR	.690 <T	BDL	56.000	44.000	.	.	23.000	20.000
MAY	1.100 <T	.680 <T	.	.	.	.	8.200	7.900
JUN	.750 <T	.770 <T	82.000	22.000	.	.	.	.
JUL	1.200 <T	.730 <T	.	.	840.000	22.000	21.000	12.000
SEP	1.200 <T	.640 <T	1400.000	16.000	.	.	34.000	22.000
OCT	.990 <T	.580 <T	85.000	12.000	.	.	26.000	10.000
NOV	.780 <T	.630 <T	.	.	90.000	12.000	.	.
DEC	2.000 <T	.790 <T	.	120.000	110.000	120.000	11.000	8.300
IRON (UG/L)			DET'N LIMIT = 6.00		GUIDELINE = 300 (A3)			
JAN	13.000 <T	BDL	7.100 <T	BDL	.	.	43.000 <T	29.000 <T
FEB	20.000 <T	6.900 <T	.	.	.	.	.	.
MAR	15.000 <T	BDL	.	.	.	.	.	.
APR	42.000 <T	BDL	BDL	8.100 <T	.	.	32.000 <T	40.000 <T
MAY	29.000 <T	BDL	.	.	.	.	27.000 <T	34.000 <T
JUN	BDL	BDL	BDL	BDL	.	.	.	.
JUL	20.000 <T	BDL	.	.	BDL	BDL	24.000 <T	16.000 <T
SEP	100.000	BDL	BDL	BDL	.	.	23.000 <T	26.000 <T
OCT	41.000 <T	BDL	BDL	BDL	.	.	17.000 <T	8.300 <T
NOV	39.000 <T	BDL	.	.	BDL	BDL	.	.
DEC	14.000 <T	BDL	.	BDL	BDL	BDL	15.000 <T	14.000 <T
MERCURY (UG/L)			DET'N LIMIT = 0.02		GUIDELINE = 1 (A1)			
JAN	.340	.110	.	.	.	.	.	.
FEB	.030 <T	.030 <T	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	BDL	BDL	.	.	.	.	.	.
MAY	BDL	BDL	.	.	.	.	.	.
JUN	BDL	BDL	.	.	.	.	.	.
JUL	BDL	BDL	.	.	.	.	.	.
SEP	BDL	BDL	.	.	.	.	.	.
OCT	.070 <T	.090 <T	.	.	.	.	.	.
NOV	BDL	BDL	.	.	.	.	.	.
DEC	BDL	BDL	.	.	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE / RAW / TYPE		WATER TREATMENT PLANT	DISTRIBUTION SYSTEM					
		TREATED	SITE 1		SITE 2		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
MANGANESE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 50 (A3)			
JAN	1.000	.410 <T	1.100	.170 <T	.	.	2.400	1.700
FEB	1.700	.740	.	.	.	.	.	.
MAR	1.300	.310 <T	.	.	.	.	.	.
APR	3.600	2.200	1.500	1.700	.	.	3.000	3.300
MAY	2.400	1.600	.	.	.	.	2.400	3.000
JUN	2.100	2.100	1.100	.850	.	.	.	.
JUL	1.400	.410 <T	.	.	.650	.400 <T	2.100	1.500
SEP	3.900	.470 <T	.460 <T	.350 <T	.	.	2.400	2.900
OCT	2.800	.290 <T	.170 <T	.210 <T	.	.	1.700	1.200
NOV	2.500	.570	.	.	.230 <T	.400 <T	.	.
DEC	2.400	.960	.	.520	.520	.520	2.600	2.700
MOLYBDENUM (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = N/A			
JAN	.150 <T	.120 <T	.120 <T	.110 <T	.	.	.130 <T	.120 <T
FEB	.120 <T	.140 <T	.	.	.	.	.	.
MAR	.100 <T	.120 <T	.	.	.	.	.	.
APR	.080 <T	.080 <T	.080 <T	.100 <T	.	.	.060 <T	.090 <T
MAY	.140 <T	.090 <T	.	.	.	.	BDL	.070 <T
JUN	BDL	.100 <T	.080 <T	.060 <T	.	.	.	.
JUL	.110 <T	.120 <T	.	.	.120 <T	.150 <T	.180 <T	.150 <T
SEP	.140 <T	.170 <T	.080 <T	.140 <T	.	.	.070 <T	.090 <T
OCT	.110 <T	.110 <T	.110 <T	.110 <T	.	.	.110 <T	.120 <T
NOV	.130 <T	.130 <T	.	.	.110 <T	.110 <T	.	.
DEC	.060 <T	.100 <T	.	.090 <T	.080 <T	.090 <T	.090 <T	.090 <T
NICKEL (UG/L)			DET'N LIMIT = 0.20		GUIDELINE = 350 (D3)			
JAN	BDL	BDL	BDL	BDL	.	.	BDL	BDL
FEB	.880 <T	.980 <T	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	BDL	BDL	BDL	BDL	.	.	BDL	BDL
MAY	BDL	BDL	.	.	.	.	BDL	BDL
JUN	BDL	BDL	.210 <T	BDL	.	.	.	.
JUL	BDL	BDL	.	.	2.800	BDL	BDL	BDL
SEP	BDL	BDL	8.900	BDL	.	.	BDL	BDL
OCT	BDL	BDL	.970 <T	BDL	.	.	BDL	BDL
NOV	BDL	BDL	.	.	.320 <T	BDL	.	.
DEC	BDL	BDL	.	BDL	BDL	BDL	BDL	BDL

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE RAW TYPE	TREATED	WATER TREATMENT PLANT SITE 1 STANDING	WATER TREATMENT PLANT SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW
LEAD (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 10. (A1)				
JAN	BDL	.070 <T	3.000	.670	.	.	.880	.840
FEB	.180 <T	BDL	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	BDL	BDL	1.300	1.300	.	.	2.000	1.200
MAY	BDL	BDL	.	.	.	.	.540	.560
JUN	BDL	BDL	2.500	.630	.	.	.	.
JUL	.060 <T	BDL	.	.	23.000	1.300	1.300	.900
SEP	.180 <T	.060 <T	100.000	.790	.	.	3.300	2.100
OCT	.080 <T	.070 <T	5.100	.730	.	.	2.400	1.000
NOV	BDL	BDL	.	.	12.000	.780	.	.
DEC	.670	BDL	.	4.900	3.000	4.900	.790	.630
ANTIMONY (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 146 (D4)				
JAN	.220 <T	.280 <T	.280 <T	.310 <T	.	.	.310 <T	.220 <T
FEB	.510	.420 <T	.	.	.	.	.	.
MAR	.350 <T	.320 <T	.	.	.	.	.	.
APR	.320 <T	.230 <T	.320 <T	.340 <T	.	.	.290 <T	.310 <T
MAY	.160 <T	.150 <T	.	.	.	.	.240 <T	.210 <T
JUN	.250 <T	.280 <T	.360 <T	.320 <T	.	.	.	.
JUL	.320 <T	.300 <T	.	.	.300 <T	.340 <T	.280 <T	.310 <T
SEP	.440 <T	.510	.500 <T	.400 <T	.	.	.390 <T	.360 <T
OCT	.420 <T	.410 <T	.500 <T	.390 <T	.	.	.350 <T	.360 <T
NOV	.310 <T	.470 <T	.	.	.400 <T	.350 <T	.	.
DEC	.400 <T	.410 <T	.	.380 <T	.430 <T	.380 <T	.350 <T	.390 <T
SELENIUM (UG/L)		DET'N LIMIT = 1.00	GUIDELINE = 10 (A1)				
JAN	BDL	BDL	BDL	BDL	.	.	BDL	BDL
FEB	BDL	BDL	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	BDL	BDL	BDL	BDL	.	.	BDL	BDL
MAY	1.100 <T	BDL	.	.	.	.	BDL	BDL
JUN	BDL	BDL	BDL	BDL	.	.	.	.
JUL	BDL	BDL	.	.	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	.	.	BDL	BDL
OCT	BDL	BDL	BDL	BDL	.	.	BDL	BDL
NOV	BDL	BDL	.	.	BDL	BDL	.	.
DEC	BDL	BDL	.	BDL	BDL	BDL	BDL	BDL

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
	SITE RAW TYPE	TREATED	SITE 1		SITE 2		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
STRONTIUM (UG/L)			DET'N LIMIT = 0.10		GUIDELINE = N/A			
JAN	23.000	22.000	25.000	25.000	.	.	24.000	24.000
FEB	29.000	28.000	.	.	.	.	.	.
MAR	23.000	22.000	.	.	.	.	.	.
APR	23.000	24.000	26.000	25.000	.	.	24.000	24.000
MAY	24.000	23.000	.	.	.	.	23.000	24.000
JUN	23.000	23.000	27.000	26.000	.	.	.	.
JUL	23.000	24.000	.	.	25.000	25.000	24.000	24.000
SEP	25.000	26.000	29.000	28.000	.	.	25.000	25.000
OCT	23.000	23.000	26.000	26.000	.	.	23.000	23.000
NOV	23.000	22.000	.	.	23.000	22.000	.	.
DEC	23.000	23.000	.	22.000	22.000	22.000	22.000	22.000
TITANIUM (UG/L)			DET'N LIMIT = 0.50		GUIDELINE = N/A			
JAN	2.200 <T	1.800 <T	2.400 <T	2.100 <T	.	.	1.800 <T	1.700 <T
FEB	3.500 <T	3.600 <T	.	.	.	.	.	.
MAR	3.000 <T	2.900 <T	.	.	.	.	.	.
APR	3.300 <T	2.800 <T	2.600 <T	3.500 <T	.	.	2.800 <T	2.700 <T
MAY	4.300 <T	3.400 <T	.	.	.	.	3.500 <T	3.400 <T
JUN	4.700 <T	4.700 <T	4.700 <T	4.700 <T	.	.	.	.
JUL	4.300 <T	3.500 <T	.	.	4.100 <T	4.500 <T	3.700 <T	3.700 <T
SEP	7.100	3.600 <T	4.700 <T	4.900 <T	.	.	4.200 <T	4.200 <T
OCT	2.800 <T	1.900 <T	2.100 <T	2.200 <T	.	.	1.700 <T	2.000 <T
NOV	4.200 <T	3.200 <T	.	.	3.900 <T	3.800 <T	.	.
DEC	2.200 <T	2.100 <T	.	3.100 <T	3.100 <T	3.100 <T	1.900 <T	2.100 <T
URANIUM (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 100 (A1)			
JAN	BDL	BDL	BDL	BDL	.	.	BDL	BDL
FEB	.070 <T	BDL	.	.	.	.	.	.
MAR	.080 <T	BDL	.	.	.	.	.	.
APR	.060 <T	BDL	BDL	BDL	.	.	BDL	BDL
MAY	BDL	BDL	.	.	.	.	BDL	BDL
JUN	BDL	BDL	BDL	BDL	.	.	.	.
JUL	.060 <T	BDL	.	.	BDL	BDL	BDL	BDL
SEP	.070 <T	BDL	BDL	BDL	.	.	BDL	BDL
OCT	BDL	BDL	BDL	BDL	.	.	BDL	BDL
NOV	.060 <T	BDL	.	.	BDL	BDL	.	.
DEC	.070 <T	BDL	.	BDL	BDL	BDL	BDL	BDL

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

	SITE		WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1		SITE 2		SITE 3	
	TYPE		STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
VANADIUM (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = N/A			
JAN	.250 <T	.520	.550	.430 <T	.	.	.350 <T	.410 <T
FEB	.320 <T	.650	.	.	.	.	.	.
MAR	.250 <T	.470 <T	.	.	.	.	.	.
APR	.310 <T	.640	.510	.570	.	.	.470 <T	.490 <T
MAY	.260 <T	.610	.	.	.	.	.470 <T	.460 <T
JUN	.580	.560	.550	.570	.	.	.	.
JUL	.250 <T	.420 <T	.	.	.290 <T	.480 <T	.380 <T	.430 <T
SEP	.450 <T	.330 <T	BDL	.420 <T	.	.	.330 <T	.300 <T
OCT	.250 <T	.200 <T	.360 <T	.300 <T	.	.	.230 <T	.230 <T
NOV	.230 <T	.170 <T	.	.	.200 <T	.160 <T	.	.
DEC	.140 <T	.080 <T	.	.110 <T	.110 <T	.110 <T	.060 <T	.070 <T
ZINC (UG/L)			DET'N LIMIT = 0.20		GUIDELINE = 5000 (A3)			
JAN	1.500 <T	1.200 <T	27.000	1.800 <T	.	.	3.200	2.400
FEB	2.800	2.800	.	.	.	.	.	.
MAR	1.800 <T	1.000 <T	.	.	.	.	9.600	5.000
APR	1.300 <T	.470 <T	5.300	4.900	.	.	1.700 <T	1.600 <T
MAY	1.200 <T	.850 <T	.	.	.	.	.	.
JUN	1.500 <T	1.800 <T	25.000	2.600	.	.	3.400	1.700 <T
JUL	1.600 <T	.550 <T	.	.	43.000	1.300 <T	7.200	3.900
SEP	1.600 <T	.820 <T	73.000	1.200 <T	.	.	10.000	2.200
OCT	2.100	2.200	5.400	1.000 <T	6.900	2.100	.	.
NOV	2.100	2.200	.	.	4.900	8.800	3.400	1.600 <T
DEC	1.800 <T	1.700 <T	.	8.800				

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE	RAW	TREATED	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
			SITE 1		SITE 2		SITE 3	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
CHLOROAROMATICS								
HEXACHLOROETHANE (NG/L)			DET'N LIMIT = 1.000		GUIDELINE = 1900 (D4)			
JAN	BDL	BDL	.	BDL	.	.	.	BDL
FEB	BDL	BDL	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	.	.	.	.	BDL
JUN	BDL	BDL	.	BDL	.	.	.	BDL
JUL	BDL	IIS	.	.	.	BDL	.	.
AUG	BDL	BDL	.	BDL	.	.	.	BDL
SEP	BDL	BDL	.	BDL	.	.	.	BDL
OCT	BDL	BDL	.	.	.	BDL	.	.
NOV	BDL	BDL	.	BDL	.	BDL	.	BDL
DEC	BDL	2.000 <T	.	.	.	BDL	.	.
HEXACHLOROCYCLOPENTADIENE (NG/L)			DET'N LIMIT = 5.0		GUIDELINE = 206000 (D4)			
OCT	BDL	35.000 <T	.	BDL	.	.	.	60.000
NOV	BDL	BDL	.	.	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	BDL	.	BDL

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
	SITE RAW TYPE	TREATED	SITE 1		SITE 2		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
PHENANTHRENE (NG/L PAH)			DET'N LIMIT = 10.		GUIDELINE = N/A			
JAN	BDL	BDL	.	.	.	.	.	.
FEB	BDL	BDL	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	BDL	BDL	.	.	.	.	.	.
MAY	BDL	!QU	.	.	.	.	.	.
JUN	30.000 <T	BDL	.	.	.	.	.	.
JUL	!QU	!QU	.	.	.	.	.	.
SEP	BDL	BDL	.	.	.	.	.	.
OCT	BDL	BDL	.	.	.	.	.	.
NOV	BDL	BDL	.	12.000 <T	.	.	.	33.000 <T
DEC	BDL	BDL	.	.	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE	RAW	TREATED	WATER TREATMENT PLANT SITE 1		DISTRIBUTION SYSTEM SITE 2		SITE 3	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
PESTICIDES & PCB								
ALPHA BHC (NG/L)			DET'N LIMIT = 1.000		GUIDELINE = 700 (G)			
JAN	5.000 <T	4.000 <T	.	5.000 <T	.	.	.	6.000 <T
FEB	4.000 <T	2.000 <T	.	.	.	.	.	.
MAR	3.000 <T	3.000 <T	.	.	.	.	.	.
APR	5.000 <T	5.000 <T	.	5.000 <T	.	.	.	5.000 <T
MAY	2.000 <T	3.000 <T	.	.	.	.	.	3.000 <T
JUN	4.000 <T	3.000 <T	.	2.000 <T	.	.	.	.
JUL	4.000 <T	IIS	.	.	.	3.000 <T	.	4.000 <T
SEP	4.000 <T	4.000 <T	.	3.000 <T	.	.	.	5.000 <T
OCT	BDL	4.000 <T	.	3.000 <T	.	.	.	BDL
NOV	5.000 <T	5.000 <T	.	.	.	5.000 <T	.	.
DEC	3.000 <T	3.000 <T	.	2.000 <T	.	2.000 <T	.	4.000 <T
LINDANE (NG/L)			DET'N LIMIT = 1.000		GUIDELINE = 4000 (A1)			
JAN	BDL	BDL	.	BDL	.	.	.	1.000 <T
FEB	BDL	BDL	.	.	.	.	.	.
MAR	1.000 <T	BDL	.	.	.	.	.	.
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	.	.	.	.	BDL
JUN	BDL	2.000 <T	.	BDL	.	.	.	.
JUL	BDL	IIS	.	.	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	.	.	BDL
OCT	BDL	BDL	.	BDL	.	.	.	BDL
NOV	BDL	BDL	.	.	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	BDL	.	BDL

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
	RAW	TREATED	SITE 1		SITE 2		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
TYPE	PHENOLICS	PHENOLICS						
PHENOLICS (UG/L)			DET'N LIMIT = .200		GUIDELINE = 2 (A4)			
JAN	.400 <T	BDL						
FEB	BDL	.600 <T						
MAR	.600 <T	BDL						
APR	.400 <T	BDL						
MAY	BDL	.400 <T						
JUN	.800 <T	.800 <T						
JUL	BDL	.400 <T						
SEP	BDL	.800 <T						
OCT	1.000 <T	1.000 <T						
NOV	BDL	BDL						
DEC	1.200	.600 <T						

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE	RAW	TREATED	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
			SITE 1		SITE 2		SITE 3	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
VOLATILES								
BENZENE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 5 (A1)			
JAN	BDL	BDL	.	.	.	.	.	BDL
FEB	.	BDL	.	.	.	.	.	.
MAR	BDL	.050 <T	.	.	.	.	.	.
APR	BDL	.050 <T	.	.	.	.	.	.
MAY	BDL	BDL	.	.050 <T	.	.	.	.050 <T
JUN	.050 <T	BDL	.	.	.	.	.	BDL
JUL	BDL	BDL	.	IBT	.	.	.	.
SEP	BDL	BDL	.	.	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	.	.	BDL
NOV	BDL	BDL	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	BDL	.	.
			.	BDL	.	BDL	.	BDL
ETHYLBENZENE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 2.4 (A3)			
JAN	BDL	BDL	.	.	.	.	.	BDL
FEB	.	BDL	.	.	.	.	.	.
MAR	.100 <T	.100 <T	.	.	.	.	.	.
APR	BDL	.200 <T	.	.100 <T	.	.	.	.100 <T
MAY	BDL	.100 <T	.	.	.	.	.	.050 <T
JUN	.200 <T	.050 <T	.	IBT	.	.	.	.
JUL	.050 <T	BDL	.	.	.	BDL	.	.050 <T
SEP	.150 <T	.150 <T	.	.150 <T	.	.	.	.150 <T
OCT	BDL	.050 <T	.	.050 <T	.	.	.	.050 <T
NOV	.050 <T	BDL	.	.	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	BDL	.	BDL
P-XYLENE (UG/L)			DET'N LIMIT = 0.10		GUIDELINE = 300 (A3*)			
JAN	BDL	BDL	.	.	.	.	.	BDL
FEB	.	BDL	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	.	.	.	.	BDL
JUN	BDL	BDL	.	IBT	.	.	.	.
JUL	BDL	BDL	.	.	.	BDL	.	BDL
SEP	BDL	BDL	.	.100 <T	.	.	.	BDL
OCT	BDL	BDL	.	BDL	.	.	.	BDL
NOV	BDL	BDL	.	.	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL	.	.
								BDL

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE RAW TYPE		TREATED	WATER TREATMENT PLANT SITE 1 STANDING	WATER TREATMENT PLANT SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW
O-XYLENE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 300 (A3*)				
JAN	BDL	BDL	.	.	.	.	.	BDL
FEB	.	BDL	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	.	.	.	.	BDL
JUN	BDL	BDL	.	IBT	.	.	.	.
JUL	BDL	BDL	.	.	.	BDL	.	BDL
SEP	BDL	BDL	.	.100 <T	.	.	.	BDL
OCT	BDL	BDL	.	.050 <T	.	.	.	BDL
NOV	BDL	BDL	.	.	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	BDL	.	BDL
STYRENE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 100 (D1)				
JAN	BDL	BDL	.	.	.	.	.	BDL
FEB	.	BDL	.	.	.	.	.	.
MAR	.250 <T	BDL	.	.	.	.	.	.
APR	BDL	.050 <T	.	.150 <T	.	.	.	.100 <T
MAY	BDL	BDL	.	.	.	.	.	BDL
JUN	.500 <T	BDL	.	IBT	.	.	.	.
JUL	.100 <T	BDL	.	.	.	BDL	.	BDL
SEP	.250 <T	BDL	.	.050 <T	.	.	.	BDL
OCT	BDL	BDL	.	BDL	.	.	.	BDL
NOV	.100 <T	BDL	.	.	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	BDL	.	BDL
CHLOROFORM (UG/L)			DET'N LIMIT = 0.10	GUIDELINE = 350 (A1+)				
JAN	.300 <T	31.400	.	.	.	.	.	31.300
FEB	.	16.400	.	.	.	.	.	.
MAR	.200 <T	27.800	.	.	.	.	.	.
APR	1.000	32.600	.	26.900	.	.	.	32.400
MAY	.100 <T	36.300	.	.	.	.	.	31.800
JUN	.400 <T	48.100	.	IBT	.	.	.	.
JUL	.100 <T	27.900	.	.	.	46.800	.	36.500
SEP	BDL	28.900	.	51.900	.	.	.	32.900
OCT	BDL	32.800	.	45.500	.	.	.	34.600
NOV	BDL	24.100	.	.	.	38.100	.	.
DEC	BDL	17.600	.	39.800	.	39.800	.	20.800

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE / RAW TYPE	TREATED	WATER TREATMENT PLANT SITE 1 STANDING	WATER TREATMENT PLANT SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW
111, TRICHLOROETHANE (UG/L)		DET'N LIMIT = 0.02	GUIDELINE = 200 (D1)				
JAN	.020 <T	.	.	.	.	.	BDL
FEB	.	BDL	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.
APR	BDL	BDL	.	BDL	.	.	.340
MAY	BDL	BDL	.	.	.	.	BDL
JUN	.040 <T	BDL	.	IBT	.	.	.
JUL	BDL	BDL	.	.	.	BDL	BDL
SEP	BDL	BDL	.	BDL	.	.	BDL
OCT	BDL	BDL	.	BDL	.	.	BDL
NOV	BDL	BDL	.	.	.	BDL	.
DEC	BDL	BDL	.	BDL	.	BDL	BDL
DICHLOROBROMOMETHANE (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 350 (A1+)				
JAN	BDL	4.750	.	.	.	.	4.450
FEB	.	3.700	.	.	.	.	.
MAR	BDL	4.500	.	.	.	.	.
APR	BDL	3.250	.	2.100	.	.	3.000
MAY	BDL	3.400	.	.	.	.	3.300
JUN	BDL	3.850	.	IBT	.	.	.
JUL	BDL	4.350	.	.	.	4.000	4.500
SEP	BDL	4.400	.	5.300	.	.	4.550
OCT	BDL	4.800	.	4.950	.	.	4.750
NOV	BDL	3.500	.	.	.	4.200	.
DEC	BDL	2.850	.	3.500	.	3.500	3.350
CHLORODIBROMOMETHANE (UG/L)		DET'N LIMIT = 0.10	GUIDELINE = 350 (A1+)				
JAN	BDL	.300 <T	.	.	.	.	.700 <T
FEB	.	.600 <T	.	.	.	.	.
MAR	BDL	.500 <T	.	.	.	.	.
APR	BDL	.300 <T	.	.200 <T	.	.	.300 <T
MAY	BDL	.300 <T	.	.	.	.	.300 <T
JUN	BDL	.300 <T	.	IBT	.	.	.
JUL	BDL	.400 <T	.	.	.	.400 <T	.
SEP	BDL	.400 <T	.	.400 <T	.	.	.400 <T
OCT	BDL	.500 <T	.	.400 <T	.	.	.400 <T
NOV	BDL	.300 <T	.	.	.	.400 <T	.
DEC	BDL	.200 <T	.	.200 <T	.	.200 <T	.200 <T

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM THUNDER BAY (BARE POINT WTP) 1990

SITE	RAW	TREATED	WATER TREATMENT PLANT / DISTRIBUTION SYSTEM					
			SITE 1		SITE 2		SITE 3	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
T-CHLOROETHYLENE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 5 (D1)			
JAN	BDL	BDL	.	.	.	.	.	BDL
FEB	.	BDL	.	.	.	.	.	.
MAR	BDL	BDL	.	.	.	.	.	.
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	.	.	.	.	BDL
JUN	.150 <T	BDL	.	IBT	.	.	.	.
JUL	BDL	BDL	.	.	.	BDL	.	BDL
SEP	.050 <T	.050 <T	.	BDL	.	.	.	BDL
OCT	BDL	BDL	.	BDL	.	.	.	BDL
NOV	BDL	BDL	.	.	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	BDL	.	BDL
TOTL TRIHALOMETHANES (UG/L)			DET'N LIMIT = 0.50		GUIDELINE = 350 (A1)			
JAN	BDL	36.450	.	.	.	.	.	36.450
FEB	.	20.700	.	.	.	.	.	.
MAR	BDL	32.800	.	.	.	.	.	.
APR	1.000 <T	36.150	.	29.200	.	.	.	35.700
MAY	BDL	40.000	.	.	.	.	.	35.400
JUN	BDL	52.200	.	IBT	.	.	.	.
JUL	BDL	32.650	.	.	.	51.200	.	41.400
SEP	BDL	33.650	.	57.550	.	.	.	37.900
OCT	BDL	38.050	.	50.900	.	.	.	39.800
NOV	BDL	28.000	.	.	.	42.700	.	.
DEC	BDL	20.750	.	43.450	.	43.450	.	24.350

TRACE LEVELS OF TOLUENE ARE LABORATORY ARTIFACTS DERIVED FROM THE ANALYTICAL METHODOLOGY.

TRACE LEVELS OF STYRENE ARE CONSIDERED TO BE LABORATORY ARTIFACTS RESULTING FROM THE LABORATORY SHIPPING CONTAINERS.

TABLE 6
DRINKING WATER SURVEILLANCE PROGRAM 1990

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
FECAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	0 (A1)
STANDARD PLATE COUNT MEMBRANE FILT.	CT/ML	0	500/ML (A3)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100ML (A1)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	0	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	0	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	0	N/A
FIELD PH	DMNSLESS	N/A	6.5-8.5 (A3)
FIELD TEMPERATURE	DEG.C	N/A	15.0 (A3)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	0.2	30-500 (A3)
AMMONIUM TOTAL	MG/L	0.002	0.05 (F2)
CALCIUM	MG/L	0.2	100 (F2)
CHLORIDE	MG/L	0.2	250 (A3)
COLOUR	TCU	0.5	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.0	400 (F2)
CYANIDE	MG/L	0.001	0.2 (A1)
DISSOLVED ORGANIC CARBON	MG/L	0.1	5.0 (A3)
FLUORIDE	MG/L	0.01	2.4 (A1)
HARDNESS	MG/L	0.5	80-100 (A4)
LANGELIERS INDEX	DMNSLESS	N/A	N/A
MAGNESIUM	MG/L	0.1	30.0 (F2)
NITRITE	MG/L	0.001	1.0 (A1)
NITROGEN TOTAL KJELDAHL	MG/L	0.02	N/A
PH	DMNSLESS	N/A	6.5-8.5 (A4)
PHOSPHORUS FIL REACT	MG/L	0.0005	N/A
PHOSPHORUS TOTAL	MG/L	0.002	0.4 (F2)
SODIUM	MG/L	0.2	200 (A4)
SULPHATE	MG/L	0.2	500 (A3)
TOTAL NITRATES	MG/L	0.005	10.0 (A1)
TURBIDITY	FTU	0.05	1.0 (A1)
CHLOROAROMATICS			
123 TRICHLOROBENZENE	NG/L	5.0	N/A
1234 TETRACHLOROBENZENE	NG/L	1.0	N/A
1235 TETRACHLOROBENZENE	NG/L	1.0	N/A
124 TRICHLOROBENZENE	NG/L	5.0	10000 (I)
1245-TETRACHLOROBENZENE	NG/L	1.0	38000 (D4)
135 TRICHLOROBENZENE	NG/L	5.0	N/A
236 TRICHLOROTOLUENE	NG/L	5.0	N/A
245 TRICHLOROTOLUENE	NG/L	5.0	N/A
26A TRICHLOROTOLUENE	NG/L	5.0	N/A
HEXACHLOROBENZENE	NG/L	1.0	10 (C1)
HEXACHLOROBUTADIENE	NG/L	1.0	450 (D4)
HEXACHLOROCYCLOPENTADIENE	NG/L	5.0	206000 (D4)
HEXACHLOROETHANE	NG/L	1.0	1900 (D4)
OCTACHLOROSTYRENE	NG/L	1.0	N/A
PENTACHLOROBENZENE	NG/L	1.0	74000 (D4)
CHLOROPHENOLS			
234 TRICHLOROPHENOL	NG/L	100.0	N/A
2345 TETRACHLOROPHENOL	NG/L	20.0	N/A
2356 TETRACHLOROPHENOL	NG/L	10.0	N/A

TABLE 6
DRINKING WATER SURVEILLANCE PROGRAM 1990

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
245 TRICHLOROPHENOL	NG/L	100.0	2600000 (D4)
246 TRICHLOROPHENOL	NG/L	20.0	5000 (A1)
PENTACHLOROPHENOL	NG/L	10.0	60000 (A1)
METALS			
ALUMINUM	UG/L	0.10	100 (A4)
ANTIMONY	UG/L	0.05	146 (D4)
ARSENIC	UG/L	0.10	25 (A1)
BARIUM	UG/L	0.05	1000 (A2)
BERYLLIUM	UG/L	0.05	6800 (D4)
BORON	UG/L	2.00	5000 (A1)
CADMIUM	UG/L	0.05	5 (A1)
CHROMIUM	UG/L	0.50	50 (A1)
COBALT	UG/L	0.02	N/A
COPPER	UG/L	0.50	1000 (A3)
IRON	UG/L	6.00	300 (A3)
LEAD	UG/L	0.05	10 (A1)
MANGANESE	UG/L	0.05	50 (A3)
MERCURY	UG/L	0.02	1 (A1)
MOLYBDENUM	UG/L	0.05	N/A
NICKEL	UG/L	0.20	350 (D3)
SELENIUM	UG/L	1.00	10 (A1)
SILVER	UG/L	0.05	50 (A1)
STRONTIUM	UG/L	0.10	N/A
THALLIUM	UG/L	0.05	13 (D4)
TITANIUM	UG/L	0.50	N/A
URANIUM	UG/L	0.05	100 (A1)
VANADIUM	UG/L	0.05	N/A
ZINC	UG/L	0.20	5000 (A3)
PAH			
ANTHRACENE	NG/L	1.0	N/A
BENZO(A) ANTHRACENE	NG/L	20.0	N/A
BENZO(A) PYRENE	NG/L	5.0	10.0 (A1)
BENZO(B) CHRYSENE	NG/L	2.0	N/A
BENZO(B) FLUORANTHENE	NG/L	10.0	N/A
BENZO(E) PYRENE	NG/L	50.0	N/A
BENZO(G,H,I) PERYLENE	NG/L	20.0	N/A
BENZO(K) FLUORANTHENE	NG/L	1.0	N/A
CHRYSENE	NG/L	50.0	N/A
CORONENE	NG/L	10.0	N/A
DIBENZO(A,H) ANTHRACENE	NG/L	10.0	N/A
DIMETHYL BENZO(A) ANTHRACENE	NG/L	5.0	N/A
FLUORANTHENE	NG/L	20.0	42000.0 (D4)
INDENO(1,2,3-C,D) PYRENE	NG/L	20.0	N/A
PERYLENE	NG/L	10.0	N/A
PHENANTHRENE	NG/L	10.0	N/A
PYRENE	NG/L	20.0	N/A
PESTICIDES & PCB			
ALACHLOR (LASSO)	NG/L	500.0	5000 (A2)
ALDRIN	NG/L	1.0	700 (A1)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700 (G)
ALPHA CHLORDANE	NG/L	2.0	7000 (A1)
AMETRINE	NG/L	50.0	300000 (D3)
ATRATONE	NG/L	50.0	N/A
ATRAZINE	NG/L	50.0	60000 (A2)
DES ETHYL ATRAZINE	NG/L	200.0	60000 (A2)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300 (G)
CYANAZINE (BLADEX)	NG/L	100.0	10000 (A2)
O,P-DDD	NG/L	5.0	10 (I)
DIELDRIN	NG/L	2.0	700 (A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000 (D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	5.0	74000 (D4)

TABLE 6
DRINKING WATER SURVEILLANCE PROGRAM 1990

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
ENDOSULFAN SULPHATE (THIODAN SULPHATE)	NG/L	5.0	N/A
ENDRIN	NG/L	5.0	1600 (D3)
GAMMA CHLORDANE	NG/L	2.0	7000 (A1)
HEPTACHLOR	NG/L	1.0	3000 (A1)
HEPTACHLOR EPOXIDE	NG/L	1.0	3000 (A1)
LINDANE (GAMMA BHC)	NG/L	1.0	4000 (A1)
METHOXYCHLOR	NG/L	5.0	900000 (A1)
METOLACHLOR	NG/L	500.0	50000 (A2)
METRIBUZIN (SENCOR)	NG/L	100.0	80000 (A1)
MIREX	NG/L	5.0	N/A
P,P-DDD	NG/L	5.0	N/A
O,P-DDT	NG/L	5.0	30000 (A1)
OXYCHLORDANE	NG/L	2.0	N/A
PCB	NG/L	20.0	3000 (A2)
PPDDE	NG/L	1.0	30000 (A1)
PPDDT	NG/L	5.0	30000 (A1)
PROMETONE	NG/L	50.0	52500 (D3)
PROMETRYNE	NG/L	50.0	1000 (A2)
PROPAZINE	NG/L	50.0	700000 (D3)
SIMAZINE	NG/L	50.0	10000 (A2)
D-ETHYL SIMAZINE	NG/L	200.0	10000 (A2)
TOXAPHENE	NG/L	500.0	5000 (A1)
PHENOLICS			
PHENOLICS (UNFILTERED REACTIVE)	UG/L	0.2	2 (A4)
SPECIFIC PESTICIDES			
2,4 D PROPIONIC ACID	NG/L	100.	N/A
2,4,5-TRICHLOROPHENOXY ACETIC ACID	NG/L	50.	280000 (A1)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.	100000 (A1)
24-DICHLORORPHENOXYBUTYRIC ACID (24-DB)	NG/L	200.	18000 (B3)
BUTYLATE (SUTAN)	NG/L	2000.	245000 (D3)
CARBARYL (SEVIN)	NG/L	200.	90000 (A1)
CARBOFURAN	NG/L	2000.	90000 (A1)
CHLORPYRIFOS (DURSBAN)	NG/L	20.	N/A
CICP (CHLORPROPHAM)	NG/L	2000.	350000 (G)
DIALLATE	NG/L	2000.	N/A
DIAZINON	NG/L	20.	20000 (A1)
DICAMBA	NG/L	50.	120000 (A1)
DICHLOROVOS	NG/L	20.	N/A
EPTAM	NG/L	2000.	N/A
ETHION	NG/L	20.	35000 (G)
IPC	NG/L	2000.	N/A
MALATHION	NG/L	20.	190000 (A1)
METHYL PARATHION	NG/L	50.	7000 (B3)
METHYLTRITHION	NG/L	20.	N/A
MEVINPHOS	NG/L	20.	N/A
PARATHION	NG/L	20.	50000 (A1)
PHORATE (THIMET)	NG/L	20.	2000 (A2)
PROPOXUR (BAYGON)	NG/L	2000.	140000 (D3)
RELDAN	NG/L	20.	N/A
RONNEL	NG/L	20.	N/A
SILVEX (2,4,5-TP)	NG/L	20.	10000 (A1)
VOLATILES			
1,1 DICHLOROETHANE	UG/L	0.10	N/A
1,1 DICHLOROETHYLENE	UG/L	0.10	7 (D1)
1,2 DICHLOROBENZENE	UG/L	0.05	200 (A1)
1,2 DICHLOROETHANE	UG/L	0.05	5 (A1)

TABLE 6
DRINKING WATER SURVEILLANCE PROGRAM 1990

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
1,2 DICHLOROPROPANE	UG/L	0.05	5 (D1)
1,3 DICHLOROBENZENE	UG/L	0.10	3750 (D3)
1,4 DICHLOROBENZENE	UG/L	0.10	5 (A1)
111, TRICHLOROETHANE	UG/L	0.02	200 (D1)
112 TRICHLOROETHANE	UG/L	0.05	0.6 (D4)
1122 TETRACHLOROETHANE	UG/L	0.05	0.17(D4)
BENZENE	UG/L	0.05	5 (A1)
BROMOFORM	UG/L	0.20	350 (A1+)
CARBON TETRACHLORIDE	UG/L	0.20	5 (A1)
CHLOROBENZENE	UG/L	0.10	1510 (D3)
CHLORODIBROMOMETHANE	UG/L	0.10	350 (A1+)
CHLOROFORM	UG/L	0.10	350 (A1+)
DICHLOROBROMOMETHANE	UG/L	0.05	350 (A1+)
ETHLYENE DIBROMIDE	UG/L	0.05	50 (D1)
ETHYLBENZENE	UG/L	0.05	2.4 (A3)
M-XYLENE	UG/L	0.10	300 (A3*)
METHYLENE CHLORIDE	UG/L	0.50	50 (A1)
O-XYLENE	UG/L	0.05	300 (A3*)
P-XYLENE	UG/L	0.10	300 (A3*)
STYRENE	UG/L	0.05	100 (D1)
TETRACHLOROETHYLENE	UG/L	0.05	5 (D1)
TRANS 1,2 DICHLOROETHYLENE	UG/L	0.10	70 (D1)
TOLUENE	UG/L	0.05	24 (A3)
TOTAL TRIHALOMETHANES	UG/L	0.50	350 (A1)
TRICHLOROETHYLENE	UG/L	0.10	50 (A1)

Appendix A

DRINKING WATER SURVEILLANCE PROGRAM
PROGRAM DESCRIPTION

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality;
- a flagging mechanism for guideline exceedance;
- a definition of contaminant levels and trends;
- a comprehensive background for remedial action;
- a framework for assessment of new contaminants; and
- an indication of treatment efficiency of plant processes.

PROGRAM

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario. In 1990, 76 systems were being monitored. Water supply locations have been prioritized for surveillance based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit.

A major goal of the program is to collect valid water quality data in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analyzed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling, in order to acquire complete plant process and distribution system details and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of raw (ambient water) and treated water at the

treatment plant and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled. Sampling is carried out by operational personnel who have been trained in applicable procedures.

Comprehensive standardized procedures and field test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". Most laboratory analyses are carried out by the Ministry of Environment (MOE), Laboratory Services Branch. Radionuclides are analyzed by the Ministry of Labour.

DATA REPORTING MECHANISM

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP unit.

PROGRAM INPUTS AND OUTPUTS

There are four major inputs and four major outputs in the program.

Program Input - Plant and Distribution System Description

The system description includes plant specific non-analytical information acquired through a questionnaire and an initial plant visit. During the initial assessment of the plant and distribution system, questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The Plant and Distribution System Description consists of the following seven components:

1. PROCESS COMPONENT INVENTORY

All physical and chemical processes to which the water is subjected, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. TREATMENT CHEMICALS

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. Chemical dosages applied on the day of sampling are recorded in DWSP.

3. PROCESS CONTROL MEASUREMENTS

Documentation of in-plant monitoring of process parameters (eg. turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. Except for the recorded Field Data, in-plant monitoring results are not retained in DWSP but are retained by the water treatment plant personnel.

4. DESIGN FLOW AND RETENTION TIME

Hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. Maximum, minimum and average flow, as well as a record of the flow rate on the day of sampling, are recorded in DWSP.

5. DISTRIBUTION SYSTEM DESCRIPTION

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. SAMPLING SYSTEM

Each plant is assessed for its adequacy in terms of the sampling of bacteriological, organic and inorganic parameters. Prime considerations in the assessment and design of the sampling system are:

i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;

ii/ the water being sampled is not being modified by the sampling system;

iii/ the sample tap must be in a clean area of the plant, preferably a lab area; and

iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake,

discharge and tap); pump characteristics (model, type, capacity); and flow rate.

7. PERSONNEL
This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate MOE personnel associated with the plant.

Program Input - Field Data

The second major input to DWSP is field data. Field data is collected at the plant and from the distribution system sites on the day of sampling. Field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling, as well as, monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analyzed according to standardized DWSP protocols to allow for interplant comparison.

Program Input - Laboratory Analytical Data

The third major input to DWSP is Laboratory Analytical Data. Samples gathered from the raw, treated and distribution sampling sites are analyzed for the presence of approximately 180 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. Parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments, parameters may be measured in a "scan" producing some results for parameters that are not on the DWSP priority list, but which may be of interest. The majority of parameters are measured on a routine basis. Those that are technically more difficult and/or costly to analyze, however, are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change, notation will be made and comparison data documented.

Program Input - Parameter Reference Information

The fourth major input to DWSP is Parameter Reference Information. This is a catalogue of information for each substance analyzed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database. An example is shown in figure 1.

Program output - Query

All DWSP information is easily accessed through the Query function, therefore, anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

Program Output - Action Alerts

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the Ontario Drinking Water Objectives publication. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective, an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of the confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedances at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, guidelines/limits from other agencies are used. The Parameter Listing System, published by MOE (ISBN 0-7729-4461-X), catalogues and keeps current guidelines for 650 parameters from agencies throughout the world. If these guidelines are exceeded, the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

Program Output - Report Generation

Custom reports can be generated from DWSP to meet MOE Regional needs and to respond to public requests.

Program Output - Annual Reports

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG.1

MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

PARAMETER REFERENCE INFORMATION

BENZENE (B2001P) VOLATILES

CLASS: HEALTH METHOD: POCODO UNIT: µg/L

SOURCE	FROM	TO	METHOD	GUIDELINE	UNIT	NOTE
CAL C	85/01			0.700	µg/L	AL
CDWG C	87/01			5.000	µg/L	MAC
EPA C	87/07			5.000	µg/L	MCL
EPAA C	80/11			6.600	µg/L	AMBIENT **
FERC C	84/05			1.000	µg/L	MCL
WHO C	84/01			10.000	µg/L	GV

DESCRIPTION:**NAME:** BENZENE
CAS#: 71-43-2
MOLECULAR FORMULAE: C_6H_6
DETECTION LIMIT: (FOR METHOD POCODO) 0.05 µg/L
SYNONYMS: BENZOL; BENZOLE; COAL NAPHTHA; CARBON OIL (27). CYCLOHEXATRIENE (41).
CHARACTERISTICS: COLOURLESS TO LIGHT-YELLOW, MOBILE, NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE, AROMATIC ODOUR; VAPOURS BURN WITH SMOKING FLAME (30).
PROPERTIES: SOLUBILITY IN WATER: 1780-1800 mg/L AT 25C (41). THRESHOLD ODOUR: 0.5 - 10 PPM IN WATERTHRESHOLD TASTE: 0.5 mg/L IN WATER (39).
ENVIRONMENTAL FATE: MAY BIOACCUMULATE IN LIVING ORGANISMS AND APPEARS TO ACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT A HIGH LIPID CONTENT OR REPRESENT MAJOR METABOLIC SITES, SUCH AS LIVER OR BRAIN; SMALL QUANTITIES EVAPORATE FROM SOILS OR ARE DEGRADED RATHER QUICKLY (80).
SOURCES: COMMERCIAL: PETROLEUM REFINING; SOLVENT RECOVERY; COAL TAR DISTILLATION (39); FOOD PROCESSING AND TANNING INDUSTRIES; COMBUSTION OF CAR EXHAUST.
ENVIRONMENTAL: POSSIBLE SOURCE IS RUNOFF.

USES: DETERGENTS; NYLON; INTERMEDIATE IN PRODUCTION OF OTHER COMPOUNDS, SUCH AS PESTICIDES; SOLVENT FOR EXTRACTION AND RECTIFICATION IN RUBBER INDUSTRY; DEGREASING AND CLEANSING AGENT; GASOLINE.

TOXICITY: RATING: 4 (VERY TOXIC).
ACUTE: IRRITATING TO MUCOUS MEMBRANES; SYMPTOMS INCLUDE RESTLESSNESS, CONVULSIONS, EXCITEMENT, DEPRESSION; DEATH MAY FOLLOW RESPIRATORY FAILURE.
CHRONIC: MAY CAUSE ANAEMIA AND LEUKAEMIA (45); MUTAGENIC.
MODE OF ACTION: CHROMOABERRATION IN LYMPHOCYTE CULTURES.

CARCINOGENICITY: A KNOWN HUMAN CARCINOGEN.

REMOVAL: THE FOLLOWING PROCESSES HAVE BEEN SUCCESSFUL IN REMOVING BENZENE FROM WASTEWATER: GAC ADSORPTION, PRECIPITATION WITH ALUM AND SUBSEQUENT REMOVAL VIA SEDIMENTATION, COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION, OXIDATION

ADDITIONAL PROPERTIES:
MOLECULAR WEIGHT: 78.12
MELTING POINT: 5.5°C (27).
BOILING POINT: 80.1°C (27).
SPECIFIC GRAVITY: 0.8790 AT 20°C (27).
VAPOUR PRESSURE: 100 MM AT 26.1°C (27).
HENRY'S LAW CONSTANT: 0.00555 ATM-M3/MOLE (41).
LOG OCT./WATER PARTITION COEFFICIENT: 1.95 TO 2.13 (39).
CARBON ADSORPTION: K=1.0; 1/N=1.6; R=0.97; PH=5.3 (41)SEDIMENT/WATER PARTITION COEFFICIENT: NO DATA

NOTES: EPA PRIORITY POLLUTANT.

Appendix B

DWSP SAMPLING GUIDELINE

i) Raw and Treated at Plant

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-220 mL plastic bottle with white seal on cap -do <u>not</u> rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (**Caution:** HNO_3 is corrosive)
Volatiles (duplicates) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle -fill bottle completely without bubbles
Organics (OWOC),(OWTRI),(OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top -when 'special pesticides' are requested three extra bottles must be filled

Cyanide	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops sodium hydroxide (NaOH) (**Caution:** NaOH is corrosive)
Mercury	-250 mL glass bottle -rinse bottle and cap three times -fill to top of label -add 20 drops each nitric acid (HNO_3) and potassium dichromate ($K_2Cr_2O_7$) (**Caution:** HNO_3&$K_2Cr_2O_7$ are corrosive)
Phenols	-250 mL glass bottle -do <u>not</u> rinse bottle, preservative has been added -fill to top of label
Radionuclides (as scheduled)	-4 L plastic jug -do <u>not</u> rinse, carrier added -fill to 5 cm from top
Organic Characterization (GC/MS - once per year)	-1 L amber glass bottle; instructions as per organic -250 mL glass bottle -do <u>not</u> rinse bottle -fill completely without bubbles

<u>Steps:</u>

1. Let sampling water tap run for an adequate time to clear the sample line.

2. Record time of day on submission sheet.

3. Record temperature on submission sheet.

4. Fill up all bottles as per instructions.

5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (**Caution:** HNO_3 is corrosive)

Steps:

1. Record time of day on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-250 mL plastic bottle with white seal on cap -do not rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked

Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid HNO_3 (**Caution:** HNO_3 is corrosive)
Volatiles (duplicate) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle, preservative has been added -fill bottle completely without bubbles
Organics (OWOC) (OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top

<u>Steps:</u>

1. Record time of day on submission sheet.

2. Let cold water flow for five minutes.

3. Record temperature on submission sheet.

4. Fill all bottles as per instructions.

5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.